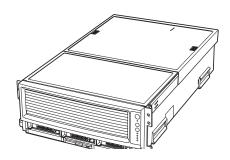
MAXDATA PLATINUM 9000-4R Server System



Product Guide

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Part I: User's Guide

- 1 **System Description**
- 2 **Board Set Description**
- 3 **Configuration Software and Utilities**
- 4 **Hot-swapping System Components**

This manual consists of two parts:

- User's Guide describes procedures that DO NOT REQUIRE internal server access. You do not need to be a qualified service technician to perform procedures listed in the User's Guide.
- Service Technician's Guide describes procedures that REQUIRE internal server access. You must be a qualified service configuration technician to perform procedures listed in the Service Technician's Guide.



A WARNING

Only a QUALIFIED SERVICE TECHNICIAN is authorized to remove the server's covers and to access any of the components inside the server, except as noted herein. Before removing top covers or a modules, see "Error! Reference source not found." and "Warnings and Cautions".



WARNING

Anchor the equipment rack: The equipment rack must be anchored to an unmovable support to prevent it from falling over when one or more servers are extended in front of the rack on slides. The anchors must be able to withstand a force of up to 113 kg (250 lbs.). You must also consider the weight of any other device installed in the rack. A crush hazard exists should the rack tilt forward which could cause serious injury.

Main AC power disconnects: You are responsible for installing an AC power disconnect for the entire rack unit. This main disconnect must be readily accessible, and it must be labeled as controlling power to the entire unit, not just to the server(s).

Grounding the rack installation: To avoid the potential for an electrical shock hazard, you must include a third wire safety-grounding conductor with the rack installation. If the server power cord is plugged into an AC outlet that is part of the rack, then you must provide proper grounding for the rack itself. If the server power cord is plugged into a wall AC outlet, the safety-grounding conductor in the power cord provides proper grounding only for the server. You must provide additional, proper grounding for the rack and other devices installed in it.

Overcurrent protection: The server is designed for an AC line voltage source with up to 20 amperes of overcurrent protection. If the power system for the equipment rack is installed on a branch circuit with more than 20 amperes of protection, you must provide supplemental protection for the server.



■ WARNING – POWER CORD RATING

Do not attempt to modify or use an AC power cord that is not the exact type required. You must use a power cord that meets the following criteria:

- Rating: For U.S./Canada cords must be UL Listed/CSA Certified, 16/3, 75C type, VW-1, SJT/SVT, with NEMA 5-15P or NEMA 6-15P attachment plug and IEC 320 C13 input power connector rated 15 amps. For outside U.S./Canada cords must be flexible harmonized (<HAR>) rated 250 V, 1.0 mm minimum conductor size with IEC 320 C13 input power connector and rated for no less than 10 amps.
- AC Attachment Connector, wall outlet end for outside U.S./Canada: The AC wall attachment plug should be a three conductor grounding type, rated at 125 V, 15 amps and must be for the configuration of the specific region or country. The AC wall attachment plug must bear at least an accepted safety agency certification mark for the specific region or country.
- Input Power Connector, server end: The connectors that plug into the AC receptacles on the server must be an IEC 320, sheet C13, type female connector and are rated for 125 V/250 V, 15 A.
- Cord length and flexibility: Cords must be less than 4.5 meters (14.76 feet) long.



A CAUTION

Temperature: The range of temperatures in which the server operates when installed in an equipment rack, must not go below 10 °C (50 °F) or rise above 35 °C (95 °F). Extreme fluctuations in temperature can cause a variety of problems in your server.

Ventilation: The equipment rack must provide sufficient airflow to the front of the server to maintain proper cooling. The rack must also include ventilation sufficient to exhaust a maximum of 1500 W (5,100 BTU/hr) for the server. The rack selected and the ventilation provided must be suitable to the environment in which the server will be used.

12 Part I: User's Guide

Regulatory Specifications and Disclaimers

Declaration of the Manufacturer or Importer

We hereby certify that this product is in compliance with European Union EMC Directive 89/336/EEC, using standards EN55022 (Class A) and EN55024 and Low Voltage Directive 73/23/EEC, Standard EN60950.

Safety Compliance

Europe:	Low Voltage Directive, 73/23/EECTUV/GS to EN60950 2nd Edition with Amendments, A1 = A2 + A3 + A4
International:	TUV/CB to IEC 60950 3rd Edition, EN60 950 2nd Edition + Amd 1-4, EMKO-TSE (74-SEC) 207/94 plus international deviations

Electromagnetic Compatibility (EMC)

Europe:	 EMC Directive, 89/336/EEC: EN55022, Class A Limit, Radiated & Conducted Emissions EN55024, ITE Specific Immunity Standard EN61000-4-2, ESD Immunity (Level 2 Contact Discharge, Level 3 Air Discharge) EN61000-4-3, Radiated Immunity (Level 2) EN61000-4-4, Electrical FastTransient (Level 2) EN61000-4-5, AC Surge EN61000-4-6, Conducted RF EN61000-4-8, Power Frequency Magnetic Fields EN61000-4-11, Voltage Dips and Interrupts EN61000-3-2, Limit for Harmonic Current Emissions EN61000-3-3, Voltage Flicker
International:	CISPR 22, Class A Limit

Electromagnetic Compatibility Notices (International) Europe (CE Declaration of Conformity)

This product has been tested in accordance too, and complies with the Low Voltage Directive (73/23/EEC) and EMC Directive (89/336/EEC). The product has been marked with the CE Mark to illustrate its compliance.

1 System Description

Introduction

The MAXDATA PLATINUM 9000-4R as shown in Figure 1 is a compact, high-density rack-mount server system with support for one to four Intel® Itanium® 2 processors and 32-GB DDR SDRAM memory. The system is based on the Intel S870BN4 board set and the Intel® E8870 chipset. The system supports hot-plug PCI and PCI-X add-in cards; hot-swap, redundant power supply modules; hot-swap, redundant cooling fans; and hot-swap hard disk drives. The system also provides interlock status LEDs for critical system interconnects. The system supports Symmetric Multiprocessing (SMP) and a variety of operating systems. Table 1 presents an overview of the server system's physical characteristics.

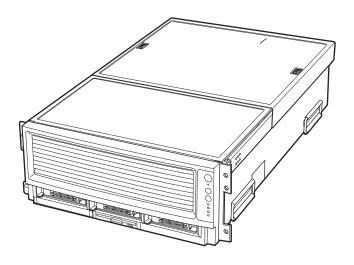


Figure 1. MAXDATA PLATINUM 9000-4R Server Front View

Table 1. Server Physical Specifications

Characteristic	Specification
Height	178 mm (6.9 inches, 4U)
Width	445 mm (17.5 inches)
Depth	711 mm (28.0 inches)
Weight (max.)	48 kg (106 lbs)1
Required front clearance	76 mm cm (3 inches)
Required rear clearance	152 mm (6 inches)
Required side clearance	25 mm (1 inch)
Heat Dissipation	1500 W (5,100 BTU/hr)

^{1.} The system weight listed above is an estimate for a fully configured system and will vary depending on the number of peripheral devices and add-in cards as well as the number of processors and DIMMs installed in the system.

Chassis Description

The chassis provides a modularized processor/memory subsystem, I/O subsystem, and peripheral bay. Other features are outlined in Table 2.

Table 2. Chassis Feature Summary

Feature	Comment
Server Configuration	Stand-alone system including external I/O PCI slots and disk expansion as needs grow Supports Intel® Itanium® 2 processors 32-GB Double Data Rate (DDR) Synchronous Dynamic Random Access Memory (SDRAM) memory support with 2-GB DIMMs
Expansion and Servicing	 Front access to hot-swap hard disk drives Three hot-swap 1-inch Ultra320 SCSI hard disk drives Rear access to hot-swap power supplies Two hot-swap 1200-W power supplies in a redundant (1+1, 220 V) configuration with redundant power cords (one per power supply) Four top access hot-swap system fans in a redundant (3+1) configuration Dockable processor/memory subsystem, I/O subsystem and peripheral bay Dockable slim-line LS-240 and DVD/CD-ROM drives Interlock status indicator LEDs for major modulesEight 64-bit hot-plug PCI-X slots
Management	 Remote management through LAN or modem Emergency Management Port Intelligent Platform Management Interface (IPMI) 1.5 compliant Wired for Management (WfM) 2.0 compliant Remote diagnostics support through LAN or modem
Upgrades	 Field upgradeable to the next generation Itanium[®] processor family Multi-generational chassis
System-level scalability	Up to 32-GB DDR SDRAM One to four Intel® Itanium® 2 processors External I/O (8 PCI slots) and disk expansion External SCSI connector

External Chassis Features

System controls and indicators are located in several places on the chassis as follows:

- Chassis front:
 - Front panel: Front panel switches and LEDs
 - Peripheral bay: Hard disk drive LEDs
 - Processor/memory module: Subsystem serviceability LEDs
- Chassis back:
 - Power supply modules (See Power Subsystem for details)
 - Hot-plug Indicator Board (HPIB)
- Chassis top:
 - I/O subsystem
 - Fan bay (See Cooling Subsystem for details)

Each of these areas is discussed in this section.

Chassis Front

Figure 2 shows the front view of the chassis with the snap-on bezel in place. The bezel provides access to the front panel board and the peripheral bay.

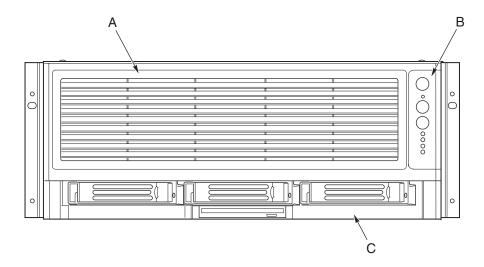


Figure 2. Chassis Front View

- A. Bezel
- B. Front Panel
- C. Peripheral Bay

Front Panel

The front panel is located to the right of the processor/memory subsystem and provides user interface for system management via switches and status indicatosr LEDs. The front panel also contains the speaker. Figure 3 shows the control buttons and status indicators on the front panel. Table 3 describes their features.

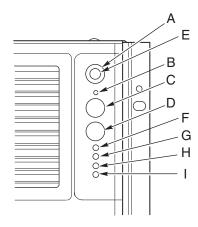


Figure 3. Front Panel Controls and Indicators

Table 3. Front Panel Control and Indicator Description

Item	Feature	Description			
Switches					
A.	System ID Switch	Toggle switch for blue System ID LEDs (the front panel system ID LED is located inside the system ID switch). See E below for description of LED operation.			
B.	Assert SDINT (System Diagnostic Interrupt) Switch	Asserts SDINT. This switch is accessible through a small opening and requires a narrow tool to activate.			
C.	Reset switch	Resets the system.			
D.	Power switch	Toggles system power. A delay of ~5 seconds is required between pressing the power switch to power down and then power up the system.			
LED Ir	ndicators				
E.	System ID (Blinking or Solid Blue). The system ID LEDs are located inside the system ID switch on the front panel and on the back panel	Identifies the system. The system ID is activated either by the system ID switch or through server management software. Pressing the system ID switch once turns on the LEDs solid blue. Press the system ID switch again, the solid blue LEDs turn off. Remove activation - LEDs turn on blinking for 4 minutes (max). The system ID LEDs cannot be turned off by pressing the switch.			
F.	Main Power (Solid or Blinking Green)	A continuously lit LED indicates the presence of DC power in the system. The LED goes out when the power is turned off or the power source is disrupted. Blinking Green indicates the system is in sleep mode.			
G.	Power Fault (Solid Amber)	Indicates any system power faults. Off indicates power is OK.			
H.	Cooling Fault (Solid Amber)	Indicates any system cooling faults. Off indicates system cooling is OK.			
I.	General Fault (Solid amber)	Indicates a system failure. Off indicates system is OK.			

Peripheral Bay



⚠ CAUTION

Removal of the LS240 and the DVD/CD drives requires removal of the peripheral bay from the chassis. Therefore, the LS240 and the DVD/CD drives cannot be hot-swapped. Power must be removed from the system when installing or removing these drives to avoid component damage.

The peripheral bay consists of two sections:

- The hot-swap hard drive bay (upper section) supporting three 1-inch hot-swap Ultra320 SCSI hard disk drives (A in Figure 4).
- The removable media drive bay (lower section) supporting:
 - One ½-inch IDE DVD/CD-ROM (B in Figure 4)
 - One ½-inch IDE LS-240 drive (C in Figure 4) or removable EMI Filler Panel (D in Figure 4).

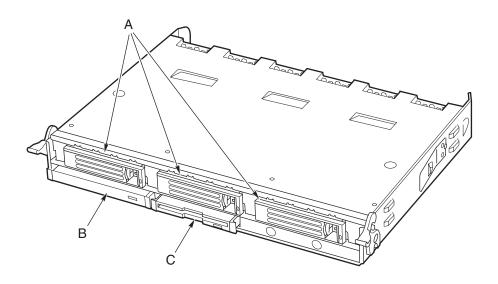


Figure 4. Peripheral Bay

Hot-swap Hard Disk Drive Bay

The hot-swap hard disk drive carrier (see Figure 5) is designed to accept 15,000-RPM (and slower) Ultra320 SCSI technology SCA-type hard disk drives.

The peripheral bay is designed to support Low Voltage Differential (LVD) SCSI disk drives only. Single-Ended (SE) SCSI devices are not supported in the peripheral bay. SE drives are only supported on the external SCSI connector.

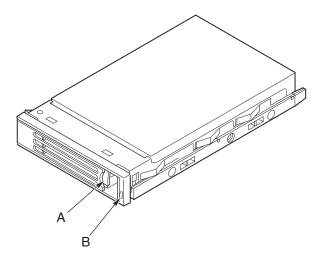


Figure 5. Hard Disk Drive Carrier

- A. Carrier latch
- B. Status indicator

The carriers contain light-pipes that allow dual color LED indicators to show thirough the bezel to display hard disk drive status as described in Table 4.

Table 4. SCSI Hard Drive LED Details

Feature	Description	
Green, flashing	Indicates the hard drive is active	
Yellow/Green flashing	Indicates a hard drive fault and hard drive is powered	
Yellow/Blank flashing	Indicates a hard drive fault and hard drive is not powered	
Not illuminated	Indicates no hard drive is installed in the bay	

Removable Media Drive Bays

The slim-line LS-240 and DVD/CD-ROM drives and their adapter boards are installed in plastic carriers (see Figure 6) and are inserted from the front of the removable media drive bay. You must switch off system power and remove the peripheral bay to remove or install these drives. If the LS-240 is not included with the server, then a filler panel must be used (see D in Figure 6).

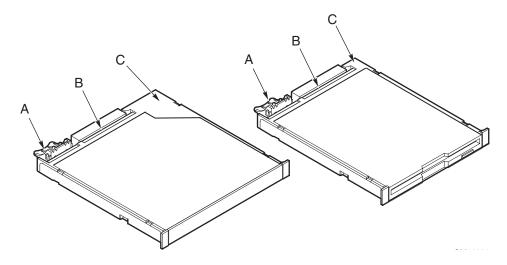


Figure 6. DVD/CD-ROM and LS-240 Drive Carriers

DVD/CD-ROM

- A. Latch
- **B.** Adapter board with locking connector
- C. Plastic Carrier

LS-240 Floppy Disk Drive

- A. Latch
- B. Adapter board with locking connector
- C. Plastic Carrier

SCSI Backplane Board

The SCSI backplane board mates with the midplane board connector. It contains three 80-pin Single Connector Attachment (SCA)-2 connectors for hot-swap hard disk drives. The SCSI backplane board performs the tasks associated with hot-swapping the hard disk drives and enclosure monitoring and management. The features supported by the SCSI backplane board include the following:

- Monitoring the SCSI bus for enclosure services messages, and acting on them appropriately.
 Examples of such messages include: activate a drive fault indicator; power down a drive that has failed; and report SCSI backplane temperature.
- SAF-TE intelligent agent, which acts as proxy for "dumb" I2C devices (that have no bus mastering capability) during intrachassis communications.

Processor/Memory Subsystem Serviceability Status Indicators

The serviceability status indicators contained in the processor/memory subsystem are shown in Figure 7 and described in Table 5. To view these indicators, remove the front bezel.

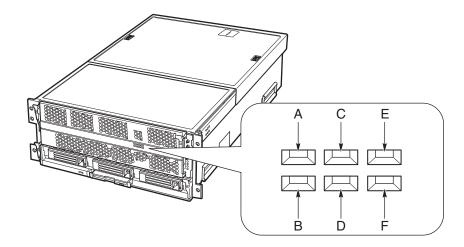


Figure 7. Location of Processor/Memory Subsystem Serviceability Indicators

Table 5. Processor/Memory Subsystem Serviceability Indicator Details

Item	Feature	Description	
А	Processor 1 Present (green)	On – Processor 1 is present and installed properly Off – Processor 1 not detected	
В	Processor 2 Present (green)	On – Processor 2 is present and installed properly Off – Processor 2 not detected	
С	Processor 3 Present (green)	On – Processor 3 is present and installed properly Off – Processor 3 not detected	
D	Processor 4 Present (green)	On – Processor 4 is present and installed properly Off – Processor 4 not detected	
Е	Memory Board 1 Interlock to Processor Board (green)	On – Memory board 1 is inserted properly into the processor board Off – Memory board 1 to processor board interlock not detected	
F	Memory Board 2 Interlock to Processor Board (green)	On – Memory board 2 is inserted properly into the processor board Off – Memory board 2 to processor board interlock not detected	

■ NOTE

Two additional LEDs (Green and Amber) and a switch appear on the left side of the processor board. These components are not implemented in the MAXDATA PLATINUM 9000-4R Server system and are not visible or accessible through the front bezel.

Chassis Back

Figure 8 shows the features found on the chassis back panel including the I/O bay, the power supply modules, and user-accessible connectors.

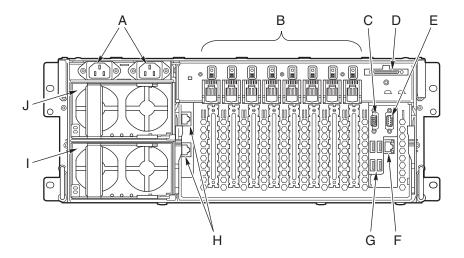


Figure 8. Chassis Back Features

- A. AC input power connectors
- B. PCI Slots (All slots support hot-plug PCI add-in cards)¹

Slots 1 through 4 100-MHz, 64-bit PCI-X slot, half length Slot 5 100-MHz, 64-bit PCI-X slot, full length Slots 6 through 8 133-MHz, 64-bit PCI-X slot, full length

- C. Video port, standard VGA compatible, 15-pin connector
- D. External SCSI connector (optional)2
- E. Serial port, 9-pin RS-232 connector³
- F. Ethernet port, RJ45 connector
- G. Four USB ports, 4-pin connectors
- H. ICMB connectors in/out (optional ICMB port 1, SEMCONN 6-pin connector ICMB port 2, SEMCONN 6-pin connector
- I. Power supply 2
- J. Power supply 1

Notes: 1. PCI slots support 3.3 V signal adapter cards only.

- 2. External SCSI bus supports both LVDS and SE signals via the external SCSI connector.
- 3. Emergency Management Port (EMP) access is provided via shared serial port.

Back Panel

Figure 9 shows the location of the indicators and controls found on the back panel.

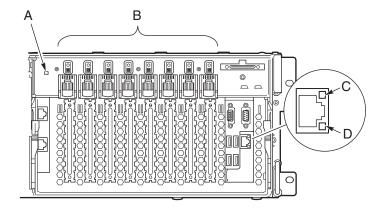


Figure 9. Back Panel View Showing Indicator and Switch Locations

System ID Indicator LED

A. System ID LED (blue) Identifies the system. The system ID LED is activated either

by the System ID switch on the front panel or through server

management.

Hot-plug PCI Add-in Card Switches and LEDs

B. Attention Switch Notifies PCI hot-plug system software (ACPI PHP ASL) that a PCI

hot-plug operation is about to take place.

WARNING: Verify in BIOS release notes that this feature is

Disables power to the PCI slot if a PCI add-in card is present.

supported before using the Attention button.

Retention Latch) Switch

On – PCI slot is powered. Off – PCI slot is powered down.

Amber LED On – PCI slot or card fault condition.

Ethernet Interface Status LED Indicators

MRL (Manually-operated

C. Network Interface Status Shows activity and status. LED (green)

D. Network Interface Status Shows activity and status.

LED (yellow)

Green LED

Power Supply LED Indicators

Each power supply module has three status LEDs the location and operating conditions for which are shown in Figure 10.

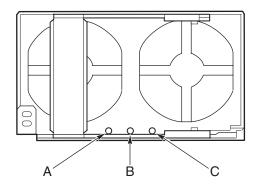


Figure 10. Power Supply Indicators

A. Power LED (green) On - indicates the presence of DC power in the system

Blinking - indicates the system is in ACPI sleep mode Off - indicates the power is turned off or the power source is

disrupted

B. Failure LED (amber) Indicates a power supply failure

C. Predictive Failure LED (amber) Indicates a power supply failure is imminent

Table 6. Power Supply LED Status Indicators

	A (PWR) Power Supply (Green LED)	B (FAIL) Power Supply Fail (Amber LED)	C (PFAIL) Predictive Failure (Amber LED)
No AC power to all PSU	OFF	OFF	OFF
No AC power to this PSU only or PS failure	OFF	OFF	ON
AC present / Standby Output On	Blinking	OFF	OFF
Power supply DC outputs ON and OK	ON	OFF	OFF
Current limit	ON	OFF	Blinking
Predictive failure	ON	Blinking/Latched	OFF

■ NOTE

Proper system cooling requires that the power supply bay be filled either by two power supply modules, or a power supply module and a filler panel.

Chassis Top

I/O Subsystem Serviceability Indicators

Figure 11 shows the I/O subsystem serviceability indicators. The indicators are located on the I/O board and are visible through the system top cover via light pipes. The I/O serviceability indicators provide system power, system reset, and interlock status for various subsystem and module connectors. These LEDs are powered by standby voltage to provide status as long as AC power is supplied to the system.

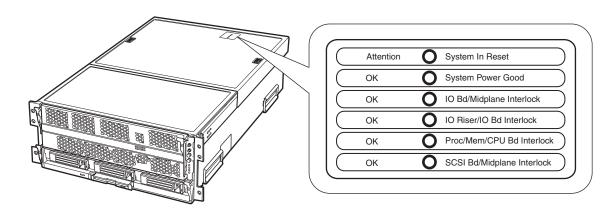


Figure 11. I/O Subsystem Serviceability Indicators

System In Reset (amber) On – system reset asserted
Off – system reset not asserted

System Power Good On – system power within normal operational range

(green) Off – system power failure

I/O Board to Midplane On - I/O subsystem inserted properly into midplane board Board Interlock (green) Off - I/O subsystem to midplane board interlock not detected

I/O Riser to I/O Board On - I/O riser inserted properly into I/O board Interlock (green) Off - I/O riser to I/O board interlock not detected

Processor/Memory/CPU On – processor/memory subsystem inserted properly into midplane board Board Interlock (green) Off – processor/memory subsystem to midplane board interlock not detected

SCSI Board to Midplane On – SCSI backplane board inserted properly into midplane board Board Interlock (green) Off – SCSI backplane board to midplane board interlock not detected

Internal Chassis Features

Power Subsystem



WARNING

Only qualified technical personnel should access the processor, memory, and non-hot-plug I/O subsystem areas while the system is energized as some exposed circuits exceed 240 VA and may cause burn injury if accidentally contacted.

The power subsystem can be configured as following:

- Two power supply modules installed, (1+1) redundancy at 220 VAC
- One power supply module installed, non-redundant at 220 VAC only
- Two power supply modules installed, non-redundant for 120 VAC

The power subsystem consists of the following:

- Power supply modules
- Plug-in DC-to-DC converters
- Power pods (located adjacent to the processors on processor board)
- The power distribution board

Power Supply Modules

The power supply modules are Server System Infrastructure (SSI) compliant, universal AC input with Power Factor Correction (PFC) Distributed Power Supplies (DPS). The power supply modules are rated at 1200 W over an input range of 180-264 VAC, and at 700 W over an input range of 90-132 VAC.

One power supply module connected to 220 VAC is capable of handling the worst-case power requirements for a fully configured system: four processors, 32 GB of memory, eight PCI add-in cards, three hard disk drives, a DVD or CD drive, and an LS-240 drive.

The power supply has two DC outputs: 48 V (main) and 12 V (standby). The 48 V main power is distributed throughout the server and is converted locally at point-of-load using either embedded or plug-in DC-to-DC converters.

In an N+1 configuration the 48 VDC outputs have active (forced) current sharing and 12 VDCSB outputs have passive current sharing.

The two externally enabled outputs have the following ratings:

- +48 VDC at: 24.0 A @HI line /13.5 A @LO line
- +12 VDCSB at: 4 A @any line

Redundant AC Power Source Operation

Each power supply module requires one power cord to supply AC power to the system. When two power supply modules and two power cords are installed, the system supports (1+1) power cord redundancy at 220 VAC. This feature allows the system to be powered by two separate AC sources. In this configuration, the system continues to operate without interruption if one of the AC sources fails.

Plug-in DC-to-DC Converters

Two types of plug-in DC-to-DC converters are used in the system:

- 5 V output
- Voltage ID (VID) (2.5 or 3.3 V output)

A control bit set by the board determines output voltage on the VID DC-to-DC converters. The T-DCto-DC converters contain an LED for failure indication.

The processor board supports three VID T-DC-to-DC converters (one 3.3 V and two 2.5 V).

The I/O board supports two 5 V and two VID (3.3 V)T-DC-to-DC converters. Each T-DC-to-DC converter powers a separate plane on the board; therefore all DC-to-DC converter slots must be populated.

Processor Power Pods

Dedicated power pods supply power to each processor. The input connector of the power pod is connected to the 48 V power on the processor board via a short cable. The output connector of the power pod mates directly with the processor package.

The Power Distribution Board

The power distribution board supplies 48 V main and 12 V standby power to all server system components.

Cooling Subsystem



⚠ CAUTION

The chassis top cover must be installed and closed for proper system cooling. Additionally, cooling components must be hot-swapped within a limited time period. This time period applies only to the time that the cooling component is physically removed, not from the time of failure.

The cooling subsystem consists of a hot-swap, redundant (3+1) system fan array installed in the fan bay, and the fans in the power supply modules. In the event of a cooling component failure, system cooling is maintained and the system continues to operate while the component is being hot-swapped. All system fans have tachometer output and internal speed control.

■ NOTE

The server supports only a fully populated system fan configuration. All configurations are redundant except those with only one power supply installed.

A series pair of 120×38 mm system fans cools the processors and part of the I/O subsystem. The rest of the processor/memory and I/O subsystem components, hard drives and power supplies are cooled by a series pair of 120×25 mm system fans along with the power supply fans. Hot-swap system fans drop into the fan bay and interface with connectors on the I/O board.

The fan bay also contains the individual fan status indicators that can be seen when the back top chassis cover is open. A system fan failure is indicated by two LEDs, the LED on the corresponding fan (A in Figure 12), and the Cooling Fault LED on the front panel (B in Figure 12).

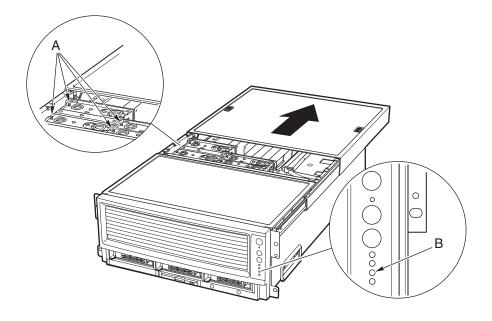


Figure 12. Fan Status Indicators

2 Board Set Description

Figure 13 displays a block diagram of the system and the board set within the system.

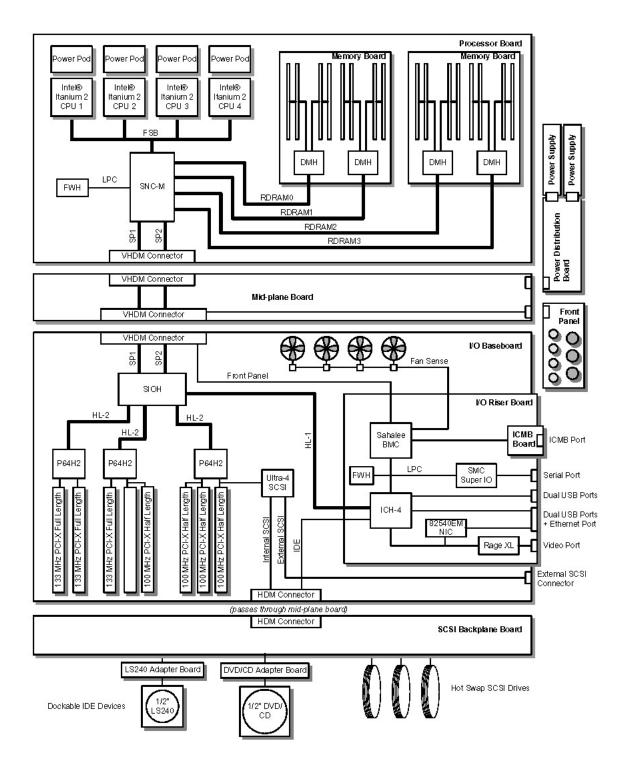


Figure 13. Server System Block Diagram

System Board Set

This section highlights the main features of the board set. The board set contains the following:

- Processor board
- Two memory boards
- I/O board
- I/O riser card
- Midplane board

In addition, the server contains the following system boards:

- Front panel board
- SCSI backplane board
- Power distribution board
- PCI HPIB
- Peripheral adapter boards
- ICMB Board (optional)

Major components of the board set include:

- Intel® Itanium® 2 processors
- Intel® E8870 chip set
- High-capacity DDR SDRAM memory
- High-bandwidth I/O subsystem supporting PCI and PCI-X

32 Board Set Description

Processor Board

The processor board contains sockets for installing up to four Intel® Itanium® 2 processors and supports up to four power pods. It also accepts the memory boards.

The processor board and memory boards are installed horizontally in the processor/memory module. The processor/memory module docks into the front of the chassis and mates with the midplane board mounted vertically in the middle of the chassis.

The processor board supports the following:

- Sockets for up to four Intel® Itanium® 2 processors. Two of the processor sockets are mounted on the secondary side of the processor board.
- Provision for up to four 48 V DC-to-DC converter power pods, one for each Intel[®] Itanium[®] 2 processor.
- DC-to-DC voltage converters:
 - Two 48 V to 2.5 V plug-in DC-to-DC converters for DDR memory support
 - One 48 V to 3.3 V plug-in DC-to-DC converter
- Embedded regulators:
 - 3.3 V to 1.2 V
 - 3.3 V to 1.5 V
 - 3.3 V to 1.8 V
 - 1.8 V to 1.3 V linear regulator
- One SNC-M component of the Intel® E8870 chip set.
- Three Firmware Hubs (FWH) for BIOS and system configuration utility (SCU) software.
- Two memory board connectors that support two Rambus channels each. One memory connector is mounted on the secondary side of the processor board.
- One VHDM 360-pin connector for I/O connections.
- One debug port for use with an In-Target Probe (ITP) (debug only).
- Two I2C system management buses (SMBus).
- Serviceability LEDs.

■ NOTE

The processor board also contains a switch and two LEDs on the front left corner of the primary side of the board that are not used in the MAXDATA PLATINUM 9000-4R Server system.

Processor Overview

Each Intel® Itanium® 2 processor plugs into a 700-pin Zero Insertion Force (ZIF) socket. Each processor is powered by a 48 V power pod located adjacent to the processor on the processor board. Attached to the top of each processor is a heat sink that dissipates thermal energy.

Memory Boards

The processor board is designed to support two memory boards (both of which must be installed for the system to operate). The memory boards are installed on the primary and secondary side of the processor board assembly.

The main components of the memory boards is described as follows:

- Eight 184-pin, DDR-SDRAM DIMM sockets support up to 16 GB of memory using eight 2 GB DIMMs per memory board for a total of 32 GB per system.
- Two DMH (DDR Memory Hub) components of the E8870 chip set. This allows two Rambus channels from the E8870-memory controller (SNC-M) to be extended to four DDR channels on the memory boards. The Rambus channel supports 400 MHz operation and the DDR channels support 100 MHz operation.
- An integrated 2.5 V to 1.25 V DC-to-DC converter provides voltage for DDR signal termination.
- I2C logic.
- Field Replaceable Unit (FRU) device ID accessed through a private I2C bus.
- Voltage/temperature sensors.

DIMMs must be installed on a memory board in groups of four (a group of four constitutes a row) as shown in Installing DIMMs."



! CAUTION

DIMMs should only be installed, removed, or replaced by a technically qualified person.



riangle caution

The system does not support mixed-sized DIMMs or DIMMs from different vendors within the same

NOTE \bigcirc

The BIOS automatically detects, sizes, and initializes the memory array, depending on the type, size, and speed of the installed DIMMs. The BIOS reports memory size and allocation to the system through configuration registers.

34 **Board Set Description**

I/O Board

The I/O board is installed horizontally in the I/O bay. The I/O riser card plugs into a connector on the I/O board. The I/O provides the following features:

- Intel® E8870 chip set with Scalability Port system interface
- Six functionally independent Peripheral Component Interconnect (PCI) bus segments
- Three hot-plug 133-MHz, 64-bit PCI-X slots
- Five hot-plug 100-MHz, 64-bit PCI-X slots
- Integrated dual channel LSI 53C1030 Ultra320 Low Voltage Differential SCSI (LVDS) controller
- I/O riser support connector for I/O interface
- On-board power conversion from 48 V bulk power
- System reset and clock generation circuits
- I2C server management interface
- Redundant hot-plug system fan interface

I/O Riser

To conserve space on the I/O board, most system I/O and server management functions have been placed on the I/O riser card that plugs into the I/O board. The I/O connectors include video, serial, Local Area Network (LAN), and Universal Serial Bus (USB). The I/O riser:

- Contains an IDE bus controller and connector. The IDE bus is routed to the I/O board where it is further routed to the midplane board's disk bay connector.
- Converts 12 V STDBY (standby) to +5 V STDBY and +3.3 V STDBY and supplies them to the I/O board.
- Mates directly onto the I/O board and together they contain all of the I/O interfaces for the board set.

The I/O riser provides the following features:

- One I/O Control Hub 4 (ICH4) component
 - Four Universal Serial Bus (USB) ports
 - One IDE interface routed through the I/O board connector
- Network Interface Card (NIC) Intel® 82540EM 10/100/1000 Ethernet controller
 - Ethernet port with I²C support
- Low Pin Count (LPC) Super I/O
 - One serial port
- 3 MB of flash memory
- Server management controller
- Integrated Intelligent Chassis Management Bus (ICMB)
- Integrated Rage XL video controller and memory
 - Video port
 - Power control Advanced Configuration and Power Interface (ACPI)
- Speaker control
- Integrated standby voltage DC-to-DC converters generating 3.3 V standby and 5 V standby

Midplane Board

The passive midplane board contains the following features:

- VHDM connectors for the processor/memory subsystem and the I/O subsystem
- An HDM connector that routes the SCSI bus, two IDE busses, and miscellaneous signals between the I/O board and the SCSI backplane
- Routing of four scalability ports
- 48 V power distribution
- 12 V standby distribution
- 3.3 V standby distribution
- 12 V distribution from the SCSI backplane board to the I/O board and power distribution board
- Blind-mate power distribution board connector
- Blind-mate front panel connector

Front Panel Board

The front panel board contains switches, LEDs, and the speaker for system interface.

SCSI Backplane Board

The SCSI backplane board supports three LVDS hard drives. Its features include:

- Three SCA connectors for hot-swap 1-inch SCSI hard drives
- One blind-mate connector for dockable slim-line IDE LS240 device
- One blind-mate connector for dockable slim-line IDE DVD or CD device
- SCSI accessed fault-tolerant enclosures (SAF-TE) logic
- 48 V to 12 V integrated DC-to-DC converter
- 12 V to 5 V integrated DC-to-DC converter
- 5 V to 2.5 V linear regulator

Peripherals

The server connects to supported peripheral devices through interfaces located on the I/O Board. The Super I/O on this board provides four USB ports, an Ethernet port, a serial port, an external SCSI connector (optional), a VGA video output port, and in and out ICMB connectors (optional).

External SCSI Connector (Optional)

An external SCSI connector is available as an option. A cable runs from the I/O board to the external SCSI connector installed on the back panel.

The I/O board contains two Ultra320 compliant SCSI channels. One channel is used internally while the other is for external system use. While the internal channel supports only Low Voltage Differential (LVD) signaling, the external channel supports both LVD and SE (single-ended) signaling. With LVD signaling, the channels can each support a maximum data rate of 320 MB/sec.

■ NOTE

The internal SCSI signal is routed to the midplane board's disk bay connector to interface with internal SCSI devices. There is an optional connector on that bus that allows an external SCSI controller to drive the internal bus.

36 Board Set Description

Add-In Board Slots

The I/O board has three 64-bit/133 MHz hot-plug PCI-X and five 64-bit/100 MHz PCI-X expansion slots contained in the following three PCI segments:

- P64H2,0 provides for PCI-X slots 1 through 3 (all 100 MHz) and the dual channel LVDS controller
- P64H2,1 provides for PCI-X slots 4 through 6 (two 100 MHz and one 133 MHz)
- P64H2,2 provides for PCI-X slots 7 and 8 (both 133 MHz)

Video

The onboard, integrated ATI RAGE XL 64-bit SVGA chip contains an SVGA controller that is fully compatible with industry video standards. The system comes with 8 MB of 10-nanosecond onboard video memory.

The video controller supports pixel resolutions of up to 1600 x 1200 and up to 16.7 million colors. The controller also provides hardware accelerated bit block transfers of data.

The SVGA controller supports analog VGA monitors (single and multiple frequency, interlaced and noninterlaced) with a maximum vertical retrace noninterlaced frequency of 100 Hz.

The video connector is located on the I/O riser.

SCSI Controller

A LSI 53C1030 Ultra3 SCSI chip is a highly integrated bus master, dual-channel SCSI I/O processor for SCSI initiator and target applications. The chip supports dual channel, Ultra3 (Fast-80) SCSI functionality. This device interfaces the PCI bus to two Ultra3 SCSI buses. The 53C1030 is a fully autonomous device, capable of managing multiple I/O operations and associated data transfers from start to finish without host intervention. The 53C1030 provides power management feature support in accordance with the PCI Bus Power Management Interface Specification.

ICH4 IDE Controller

The ICH4 IDE controller is a multifunction device on the I/O Board that acts as a PCI-based Fast IDE controller. The device controls the following:

- PIO and IDE DMA/bus master operations
- Mode 4 timing
- Transfer rates up to 22 MB/sec (33 MB/sec using ultra DMA transfers)
- Buffering for PCI/IDE burst transfers
- Master/slave IDE mode

Server Management

The server management features are implemented using two micro controllers: the Baseboard Management Controller (BMC) on the I/O board and the QLogic GEM359 SCSI hot-swap controller on the SCSI backplane board. The ICMB controller is integrated in the BMC and provides an interface to the external ICMB via the ICMB board.

The firmware for the BMC of each micro controller is field-upgradeable using the Firmware Update utility. For information on the Firmware Update Utility, refer to "Running the Firmware Update Utility" The GEM359 firmware can be updated using a separate utility.

Baseboard Management Controller (BMC)

The Baseboard Management Controller (BMC) and its associated circuitry reside on the I/O riser card. The BMC autonomously monitors system platform management events and logs their occurrences in the non-volatile System Event Log (SEL). This includes events such as over-temperature and over-voltage conditions, and fan failures. The BMC can also provide the interface to the monitored information so system management software can pole and retrieve the present status of the platform.

The BMC also provides the interface to the non-volatile 'Sensor Data Record (SDR) Repository'. Sensor Data Records provide a set of information that system management software can use to automatically configure itself for the number and type of IPMI sensors (such as temperature and voltage sensors) in the system.

The following is a list of the major functions of the BMC:

- System power control
- Platform Event Paging (PEP) / Platform Event Filtering (PEF)
- Power distribution board monitoring
- Temperature and voltage monitoring
- Fan failure monitoring
- Processor presence monitoring (no processors installed)
- Interlock monitoring
- Speaker 'Beep' capability on standby and when system is powered up
- Intel® Itanium® 2 processor SEEPROM interface (for processor information ROM [PIROM] and scratch EEPROM access)
- Processor temperature monitoring
- Hot-plug PCI slot status reporting
- Processor core ratio speed setting
- Chassis general fault light control
- Chassis cooling failure light control
- Chassis power fault light control
- Chassis power light control
- Chassis ID LEDs control
- System Event Log (SEL) interface
- Sensor Data Record (SDR) repository interface
- SDR/SEL timestamp clock
- Board set FRU information interface
- Fault resilient booting
- System management watchdog timer

38 Board Set Description

- Front panel system diagnostic-interrupt handling
- Platform Management Interruption (PMI) / System Diagnostic Interrupt (SDI) status monitor
- Event receiver
- System interface to the IPMB (via system interface ports)
- IPMI Management Controller Initialization Agent (MCIA)
- Emergency Management Port (EMP) interface
- Serial/modem and LAN alerting

In this platform, the BMC also plays the role of the chassis bridge controller, thus providing integrated ICMB support. ICMB transports server management information between various chassis in a cluster configuration that can contain multiple servers and peripherals.

QLogic GEM359 SCSI Hot-swap Controller

The QLogic GEM359 Hot-swap Controller resides on the SCSI backplane board. The primary functions of the GEM359 are as follows:

- Implements the SAF-TE command set
- Controls the SCSI Hard Drive fault LEDs
- Provides a path for management information via the SCSI
- Retrieves hard disk drive fault status, SCSI backplane temperature, and fan failure information via IPMB
- Queries the status of the power distribution board by retrieving information from the BMC via IPMB
- Controls hard disk drive power-on and power-down, facilitating hot-swapping

3 Configuration Software and Utilities

Power-on Sequence and Power-on Self-Test (POST)

Turning on the system causes POST to run and control to pass to the Boot Manager. From the Boot Manager, you can choose to invoke the Extensible Firmware Interface (EFI) Shell or you can choose to go to the Boot Maintenance Menu. For information on the EFI Shell, refer to "The Extensible Firmware Interface (EFI) Shell."

Follow these steps to power up the MAXDATA PLATINUM 9000-4R Server:

- 1. Press the power button on the front control panel. Pressing this button causes the server fans to start up and POST to begin running. You can monitor boot progress on the video display on a monitor attached to the system.
- POST, which is stored in flash memory, begins running. POST checks the drive carriers, processors, memory, keyboard, and most installed peripheral devices. During the memory test, POST displays the amount of memory it is able to access and test. The length of time needed to test memory depends on the amount of memory installed.
- 3. Video appears on the monitor attached to the system and begins to display boot progress. The AMI BIOS banner displays the loaded versions of the BIOS, PAL, SAL, and EFI.
- 4. POST concludes and passes control to the boot manager.
- 5. From the boot manager, you can use arrow keys to highlight the option that invokes the EFI shell operating system (if installed), or you can highlight and select the boot maintenance menu. Selecting the boot maintenance menu lets you configure boot options and other boot environment variables. Booting to the EFI shell causes the following prompt to appear:
 Shell>
- 6. When you see this prompt, you can load and start an operating system.

The Extensible Firmware Interface (EFI) Boot Manager

The EFI boot manager allows you to control the server's booting environment. Depending on how you have configured the boot options, after the server is powered up the boot manager presents you with different ways to bring up the system. For example, you can boot to the EFI Shell, to an operating system located on the network or residing on media in the server, or to the Boot Maintenance Menu.

- EFI Shell: A simple, interactive environment that allows EFI device drivers to be loaded, EFI
 applications to be launched, and operating systems to be booted. The EFI shell also provides a
 set of basic commands used to manage files and the system environment variables. For more
 information on the EFI Shell, refer to "The Extensible Firmware Interface (EFI) Shell."
- Boot Options: Files that you include as boot options. You add and delete boot options by using the Boot Maintenance Menu. Each boot option specifies an EFI executable with possible options. For information on the Boot Maintenance Menu options, refer to Table 7.
- Boot Maintenance Menu: A menu of items allowing you configure boot options and other boot environment variables. Table 7 describes each menu item in the Boot Maintenance Menu.

Table 7. Boot Maintenance Menu Options

Option	Description	
Boot from a File	Automatically adds EFI applications as boot options or allows you to boot from a specific file. When you choose this option, the system searches for an EFI directory in all EFI System Partitions in the system. For each EFI directory the system finds, it searches through that directory's subdirectories. Within each subdirectory, the system looks for the first file that is an executable EFI Application. Each file that meets this criterion can be automatically added as a boot option. In addition, legacy boot options for A: and C: are also added if those devices are present. Using this option, you can also launch a specific application without adding it as a boot option. In this case the EFI Boot Manager searches the root directories of all of the EFI System Partitions present in the system for the specified EFI Application. To boot from a file: At the menu, select Boot from a File Option with the arrow key. Hit the <enter> key to select. Select the EFI file to boot from with the arrow key.</enter>	
Add a Boot Option	Adds a boot option to the EFI Boot Manager. You specify the option by providing the name of the EFI application. Along with the name you can also provide either ASCII or UNICODE arguments the file might use. Given the EFI application name and any options, the EFI Boot Manager searches for the executable file in the same partitions and directories as described in "Boot from a File" option. When the file is found, it is executed. To add a boot option: At the menu, select Add Boot Option with the arrow key. Hit the <enter> key to select. Type in the name of the EFI application to add and hit <enter>. Select Save to NVRAM. Select Exit to return to the Boot Manager.</enter></enter>	
Delete Boot Options	This feature allows you to delete a specific boot option or all boot options. To delete boot options: At the menu, select Delete Boot Option with the arrow key. Hit the <enter> key to select. Select the boot option to delete with the arrow key. Hit <enter> to select. Enter <y> to confirm. Select Save to NVRAM. Select Exit to return to the Boot Manager.</y></enter></enter>	
Change Boot Order	This feature allows you to control the relative order in which the EFI Boot Manager attempts boot options. For help on the control key sequences you need for this option, refer to the help menu. To change the boot order: • At the menu, select Change Boot Order with the arrow key. • Select the Option to move with the arrow key. • Hit <u> to move up in the boot order. • Hit <d> to move down in the boot order. • Select Save to NVRAM. • Select Exit to return to the Boot Manager.</d></u>	

continued

Table 7. Boot Maintenance Menu Options (continued)

Option	Description	
Manage BootNext Setting	This feature allows you to select a boot option to use one time (the next boot operation). To manage boot next setting: • At the menu, select Manage Boot Next Setting with the arrow key. • Select the Option to boot next with the arrow key. • Hit to make this option the next boot option. • Hit <r> • Select Save to NVRAM. • Select Exit to return to the Boot Manager.</r>	
Set Auto BootTimeout	 This feature allows you to define the value in seconds that pass before the system automatically boots without user intervention. Setting this value to zero disables the timeout feature. To set auto boot timeout: At the menu, select Set Auto Boot Timeout with the arrow key. Three options are available. Select the Choose Value option with the arrow key and enter a value of "0" to disable auto boot. Select the Delete option with the arrow key and select the Delete setting with the arrow key and hit <enter>.</enter> Choose a time out value of 65535 (0xFFFF) to allow you to press any key while booting to EFI to disable timeout. 	
Select Console Output Device	This feature allows you to select the device that the console output is sent to. To select the console output device: • At the menu, select Manage Boot Next Setting with the arrow key. • Select the Option to boot next with the arrow keyHit to make this option the next boot option. • Hit <r> to reset. • Select Save to NVRAM. • Select Exit to return to the Boot Manager.</r>	
Select Console Input Device	This feature allows you to select the device that the console receives input from. To select the console input device: • At the menu, select Manage Boot Next Setting with the arrow key. • Select the Option to boot next with the arrow key. • Hit • Hit • To reset. • Select Save to NVRAM. • Select Exit to return to the Boot Manager.	
Select Standard Error Device	This feature allows you to select the standard error device. To select the standard error device: • At the menu, select Manage Boot Next Setting with the arrow key. • Select the Option to boot next with the arrow key. • Hit • Hit • To reset. • Select Save to NVRAM. • Select Exit to return to the Boot Manager.	
Cold Reset	Performs a platform-specific cold reset of the system. A cold reset means a full platform reset. To perform a cold reset: At the menu, select Set Auto BootTimeout with the arrow key. Hit <enter>. The system resets.</enter>	
Exit	Returns control to the EFI Boot Manager main menu. Selecting this option displays the active boot devices, including a possible integrated shell.	

The Extensible Firmware Interface (EFI) Shell

The EFI Shell is an EFI application that allows other EFI applications to be launched, EFI device drivers to be loaded, and operating systems to be booted. The combination of the EFI firmware and the EFI Shell provides an environment that can be modified to easily adapt to many different hardware configurations.

The EFI shell also provides a set of basic commands used to manage files and EFI NVRAM shell and boot variables. A list of these basic commands is shown in Table 8. A more detailed description of the commands is available on the EFI website. To obtain the document, navigate to the http: //developer.intel.com/technology/efi URL and click on the Tools hyperlink. Next, click on "EFI Sample Implementation 1.10.14.60" to download the files to your hard drive. After downloading the sample, locate the Microsoft® Word file named "EFI1.1ShellCommands.doc." Descriptions of the EFI shell commands are also available when operating in the EFI Shell by typing "help" and hitting the <Enter> key.

In addition to the standard shell commands available in the EFI Shell, the EFI environment allows you to create your own shell commands and EFI applications. For detailed information about the EFI Shell, its commands, and the ability to develop within the environment, refer to the EFI Developer's Guide. To obtain the document, navigate to the http://developer.intel.com/technology/efi URL and click on the Tools hyperlink. Next, click on "EFI Sample Implementation Version 1.02" to download the files to your hard drive. After downloading the sample, locate the Microsoft® Word file named "Efi_dg.doc". To develop your own shell commands, download the EFI Application Toolkit from the Tools hyperlink on the following website:

http://developer.intel.com/technology/efi

Table 8. EFI Shell Commands

Command	Description
<drive_name>:</drive_name>	Changes drives. For example, entering fs0: and pressing the <enter> key changes the drive to the LS-240 drive</enter>
alias [-bdv] [sname] [value]	Sets or gets alias settings
attrib [-b] [+/- rhs] [file]	Views or sets file attributes
bcfg -?	Configures boot driver and load options in EFI NVRAM
botmaint	Launches Boot Maintenance Manager
break	Executes a breakpoint
cd [path]	Changes the current directory
cls [background color]	Clears the screen
comp file1 file2	Compares two files
connect [-r] [-c] Handle# ½DeviceHandle# DriverHandle#	Binds the EFI driver to a device and starts the driver
cp [-r] file [file] [dest]	Copies files and directories, [-r] = recursive
date [mm/dd/yyyy]	Gets or sets the date
dblk device [Lba] [Blocks]	Performs a hex dump of Blklo Devices
devices [-b] [-1XXX]	Displays devices
devtree [-b] [-d]	Displays device tree
dh [-b] [-p prot_id] [handle]	Dumps handle information

continued

Table 8. EFI Shell Commands (continued)

Command	Description
disconnect DeviceHandle# [DriverHandle# [ChildHandle#]	Disconnects device from driver
dmem {address] [size] [;MMIO]	Displays the contents of memory
dmpstore	Dumps the variable store
drivers [-b] [-IXXX]	Displays drivers
drvcfg [-c] [-IXXX] [-f] [-v] [-s]	Invokes the driver configuration protocol
drvdiag [-c] [-lXXX] [-s] [-e] [-m]	Invokes the driver diagnostics protocol
echo [[-on -off] [text]	Echoes text to the standard output device or toggles script echo
edit [filename]	Opens the text editor allowing you to create or edit a file
eficompress infile outfile	Compresses an EFI file
Efidecompress infile outfile	Decompresses an EFI file
endfor	Provides a delimiter for loop constructs (scripts only)
endif	Provides a delimiter for IFTHEN constructs (scripts only)
for var in <set></set>	
goto label	Makes batch file execution jump to another label
guid [-b] [sname]	Dumps known guid ids
help [-b] [internal_command]	Displays help information
hexedit [[-f]FileName [-d DiskName Offset Size] [-m Offset Size]]	Edits in HEX mode
if [not] condition then	Provides conditional constructs (scripts only)
load driver_name	Loads a driver
loadbmp [-c] [-t] [-i[UGA Instance]] file	Displays a bitmap file on the screen
loadpcirom romfile	Loads a PCI option ROM
ls [-b] [dir] [dir]	Obtains directory listings
map [-bdvr] [sname[:]] [handle]	Maps sname to device path
mem [address] [size] [;MMIO]	Dumps Memory or Memory Mapped IO
memmap [-b]	Dumps memory map
mkdir dir [dir]	Creates a new directory
mm address [Width] [;Type] [n]	Memory Modify: type = Mem, MMIO, IO, PCI, [n] for non interactive mode when inside a .nsh file
mode [col row]	Sets or gets the current graphics mode
mount BlkDevice [sname[:]]	Mounts a file system on a block device
mv [src] [dst]	Move one or more files/directories to destination
pause	Prompts to quit or continue (scripts only)
pci [bus_dev] [func]	Displays PCI device information
rconnect DeviceHandle# [DriverHandle# [ChildHandle#]] [-r]	Reconnects one or more drivers from a device

continued

Table 8. EFI Shell Commands (continued)

Command	Description	
reset [reset_string]	Performs a cold reset	
rm file/dir [file/dir]	Removes files or directories	
setsize file	Sets size of a new file	
stall microseconds	Delays for the specified number of microseconds	
time [hh:mm:ss]	Gets or sets the time	
type [-a] [-u] [-b] file	Displays the contents of a file	
ver	Displays version information	
vol fs [volume_label]	Sets or displays a volume label	

Using BIOS Setup

This section describes the BIOS Setup Utility. Use this utility to change the server configuration defaults. You can run the utility with or without an operating system present on the server. Setup stores most of the configuration values in battery-backed CMOS. The rest of the values are stored in flash memory. The values take effect when you boot the server. POST uses these values to configure the hardware. If the values and the hardware do not agree, POST generates an error message and you must then run Setup to specify the correct configuration.

Run Setup to view or modify such server board features as:

- Serial port configuration
- Time/date (to be stored in RTC)
- IDE settings (LS-240, DVD/CD-ROM, etc.)
- SCSI BIOS
- Default CMOS settings and fail safe settings
- Password security
- Advanced chip set settings for boot up
- Information on system configuration, version, peripheral population, RAM size, and cache size

Starting Setup

To start Setup during the power-on sequence, follow these steps:

- 1. Press the power button on the front control panel of the server.
- 2. When POST shows the message "Hit <F2> if you want to run SETUP," press <F2>. If the server has an administrator password configured, the system prompts you to enter the password. If the server does not have a password configured, the main screen of the BIOS Setup Utility appears. For information on the setup screens, refer to "Primary Screens".

Record Your Setup Settings

Before you alter any settings you should be sure that you have recorded the current values. If the default values ever need to be restored (after a CMOS clear, for example), you must run Setup again. Referring to recorded original settings could make your task easier.

Navigating Setup Utility Screens

The BIOS setup utility consists of five primary menus. Each menu occupies a single screen and presents a list of menu items. Some menu items are sub-menus, while others are settings that you can change from the screen. Table 9 describes how to navigate the utility screens and menus.

Table 9. Using Setup Screens

Press	То	
←	Scroll left through the main menu screens	
\rightarrow	Scroll right through the main menu screens	
ENTER	Select a sub-menu item or accept a drop-down choice	
TAB	Select a field within a value (for example, date field)	
F9	Select the default value	
F10	Save your changes and exit Setup	
ESC	Go back to a previous screen	
	Scroll up through menu items or value lists	
	Scroll down through menu items or value lists	

Primary Screens

Exit

The BIOS Setup Utility uses these five primary screens:

The Bree detail clinity adds those has primary solvens.			
Main	Displays the BIOS version and details on processor type, and lets you configure the system time, date, and language. For details on this screen, see "Main".		
Advanced	Lets you configure Option ROMs, configure peripheral devices, clear the event log, and disable POST error pauses. For details on this screen, see "Advanced".		
Security	Lets you set a password. For details on this screen, see "Security".		
System Management	Lets you configure Console Redirection, Quite Boot, Serial Over LAN, and Service Partition options. Also displays BMC and HSC firmware revisions. For details on this screen, see "System Management".		

custom settings. For details on this screen, see "Exit".

Exits the utility with or without saving utilities and allows management of

Main

Table 10 describes the menu items available on the Main screen. Default values appear in brackets.

Table 10. BIOS Setup Main Screen Menu Items

Menu Item	Default Value	Description
Language	[English (US)] Spanish Italian French German	Selects which language BIOS displays.
System Time	HH:MM:SS	Set the SystemTime in hour:minute:second format.
System Date	MM/DD/YYYY	Set the System Date in month/day/year format.
Processor Settings	Press <enter> to present selection submenu</enter>	Selects the Sub-menu.
BIOS Version	[bios_version_number]	The currently loaded version of BIOS. You cannot change this value. It appears for informational purposes only.
PAL Version	[PAL_version_number]	The currently loaded version of PAL. You cannot change this value. It appears for informational purposes only.
SAL Version	[SAL_version_number]	The currently loaded version of SAL. You cannot change this value. It appears for informational purposes only.
FPSWA Version	[FPSWA_version_num]	The currently loaded version of FPSWA. You cannot change this value. It appears for informational purposes only.

Table 11. Processor Settings Submenu Items

Menu Item	Default Value	Description
Processor Retest	[Disabled] Enabled	If yes, BIOS clears historical processor status and retests all processors on the next boot
Processor 1 CPUID	N/A	Reports CPUID for Processor 1
Processor 1 L1 Cache Size	N/A	Reports L1 Cache Size for Processor 1
Processor 1 L2 Cache Size	N/A	Reports L2 Cache Size for Processor 1
Processor 1 L3 Cache Size	N/A	Reports L3 Cache Size for Processor 1
Processor 2 CPUID	N/A	Reports CPUID of the Processor 2
Processor 2 L1 Cache Size	N/A	Reports L1 Cache Size for Processor 2
Processor 2 L2 Cache Size	N/A	Reports L2 Cache Size for Processor 2
Processor 2 L3 Cache Size	N/A	Reports L3 Cache Size for Processor 2
Processor 3 CPUID	N/A	Reports CPUID of the Processor 3
Processor 3 L1 Cache Size	N/A	Reports L1 Cache Size for Processor 3
Processor 3 L2 Cache Size	N/A	Reports L2 Cache Size for Processor 3
Processor 3 L3 Cache Size	N/A	Reports L3 Cache Size for Processor 3
Processor 4 CPUID	N/A	Reports CPUID for Processor 4
Processor 4 L1 Cache Size	N/A	Reports L1 Cache Size for Processor 4
Processor 4 L2 Cache Size	N/A	Reports L2 Cache Size for Processor 4
Processor 4 L3 Cache Size	N/A	Reports L3 Cache Size for Processor 4

Advanced

Table 12 describes the menu items available on the Advanced screen. Five menu items exist on this screen. Each of these items contains sub-menus that in turn can also lead to subsequent sub-menus. Default values appear in brackets.

Table 12. BIOS Setup Advanced Screen Menu Items

Primary Menu Item	Sub Menu Items	Value	Description
Peripheral Configuration	Serial Port B	[Auto] Enabled Disabled	Configures Serial Port B at boot time. Auto Causes the server to determine the Base I/O address and interrupt to use for the port. Enabled Requires you to supply the Base I/O address and the interrupt value. Disabled Causes the server to disable the port.
	Base I/O Address	3F8 [2F8] 3E8 2E8	Determines the Base I/O Address for the port.
	Interrupt	IRQ3 [IRQ4]	Determines the Interrupt for the port.
Option ROM Configuration	PCI SLOT 1 ROM	[Enabled] Disabled	Enables Slot 1 Option ROM.
	PCI SLOT 2 ROM	[Enabled] Disabled	Enables Slot 2 Option ROM.
	PCI SLOT 3 ROM	[Enabled] Disabled	Enables Slot 3 Option ROM.
	PCI SLOT 4 ROM	[Enabled] Disabled	Enables Slot 4 Option ROM.
	PCI SLOT 5 ROM	[Enabled] Disabled	Enables Slot 5 Option ROM.
	PCI SLOT 6 ROM	[Enabled] Disabled	Enables Slot 6 Option ROM.
	PCI SLOT 7 ROM	[Enabled] Disabled	Enables Slot 7 Option ROM.
	PCI SLOT 8 ROM	[Enabled] Disabled	Enables Slot 8 Option ROM.
Event Log	Event Logging	[Enabled] Disabled	Select Enabled to allow logging to System Event Log.
Configuration	Clear All Logs	[No] Yes	Setting to Yes will clear the System Event Log
POST Error Pause		[Enabled] Disabled	Select "Disabled" if you want the system to boot with no user intervention on critical POST errors.

Security

Table 13 describes the menu items available on the Security screen.

■ NOTE

With the removal of legacy keyboard and mouse support, the legacy security core has been removed. Therefore, the security menu is briefer than on other server products. Also, the two-level password has been replaced with a single-level password.

Table 13. BIOS Setup Security Screen Menu Items

Menu Item	Default Value	Description
Administrator Password Is	[Not Installed] Installed	Status only, you cannot modify. Once set, can be disabled by setting to a null string, or clear password jumper on board.
Set Password	Press <enter></enter>	When the <enter> key is pressed, the user is prompted for a password, press ESC key to abort. Once set, can be disabled by setting to a null string, or clear password jumper on board. Note that only alpha-numeric characters are supported for the password. Other key entries are ignored Also the password is not case-sensitive.</enter>

System Management

Table 14 describes the menu items available on the System Management screen. Default values appear in brackets.

Table 14. BIOS Setup System Management Screen Menu Items

Menu Item	Default Value	Description
Quiet Boot	[Enabled] Disabled	Selecting this option enables the BIOS to display the OEM logo during POST. If disabled, the BIOS displays the normal POST messages. This option is hidden if the BIOS does not detect a valid logo in the flash area reserved for this purpose. Enabling this option disables serial redirection.
Service Boot	[Disabled] Enabled	Enabling this item allows you to boot into Service Partition Boot mode. The item automatically resets to "Disabled" on the next system boot.
>Console Redirection	Press <enter> to present selection submenu</enter>	Selecting this option allows you to configure for console redirection.
OS BootTimeout	[Enabled] Disabled 5 minutes 10 minutes 15 minutes 20 minutes	Sets the time allowed for booting an OS, from media or PXE.
BMC Revision	[BMC_Rev]	The currently loaded version of Baseboard Management Controller firmware. You cannot change this value. It appears for informational purposes only.
HSC Revision	[HSC_Rev]	Information field only, hidden if not detected. Displays the Hot Swap Controller revision.

Table 15. Setup Console Redirection Sub Menu Items

Sub Menu Item	Default Value	Description
Serial Console Redirection	Enabled/Disabled	When enabled, Console Redirection uses only COM2. Choosing "Disabled" completely disables Console Redirection.
Baud Rate	9600 [19.2K] 38.4K 57.6K 115.2K	When Console Redirection is enabled, use the baud rate specified. When EMP is sharing the COM port as console redirection, the baud rate must be set to 19.2K to match EMP baud rate.
Flow Control	No Flow Control [CTS/RTS] CTS/RTS + CD XON/XOFF	No flow control. CTS/RTS = Hardware based flow control. CTS/RTS +CD = Hardware based + Carrier Detect flow control. When EMP is sharing the COM port as console redirection, the flow control must be set to CTS/RTS or CTS/RTS+CD depending on whether a modem is used. Xon/Xoff = Software based flow control
Terminal Type	PC-ANSI VT100+ VT-UTF8	Select terminal type. Vt100+ only available when English selected as the language. VT-UTF8 uses UNICODE. PC-ANSI is the standard PC-type terminal.
Serial Port	COM2 2F8 IRQ3	Hardcoded – no selection available. Note that if Console Redirection is enabled, then the Base I/O address and IRQ selection of Serial Port B (under Menu Advanced, sub-menu Peripheral Configuration) should match this Serial Port setting under the Console Redirection submenu.
Remote Console Reset	Enabled/Disabled	Enables remote reset via escape key sequence; ESC R ESC r ESC R
ACPI OS Headless Operation	Disabled Same as BIOS Serial Port	Used to pass information about serial redirection to ACPI OS.
ACPI OS Baud Rate	9600 19.2k 38.4K 57.6k 115.2k	Only available when ACPI OS Headless Operation is Same as BIOS or Serial Port.
ACPI OS Flow Control	No Flow Control CTS/RTS XON / XOFF CTS/RTS + CD	Only available when ACPI OS Headless Operation is Same as BIOS or Serial Port . Same options as above; these are passed to the OS.
ACPI OS Terminal Type	PC-ANSI VT100+ VT-UTF8	Only available when ACPI OS Headless Operation is Same as BIOS or Serial Port . Same options as above; these are passed to the OS.

Exit

Table 16 describes the menu items available on the Exit screen. Default values appear in brackets.

Table 16. BIOS Setup Exit Screen Menu Items

Menu Item	Description	
Exit Saving Changes	Lets you exit Setup with or without saving your changes in CMOS. Clicking on the menu item causes the system to prompt you for a Yes or No response. Yes Saves your changes and exits the utility. No Discards your changes and exits the utility.	
Exit Discarding Changes	Lets you exit Setup with or without discarding your changes. Clicking on the menu item causes the system to prompt you for a Yes or No response. Yes Discards your changes and exits the utility. No Saves your changes and exits the utility.	
Load Setup Defaults	Lets you load Setup with factory defaults. Clicking on the menu item causes the system to prompt you for a Yes or No response. Yes Loads the system setup defaults. No Aborts the action.	
Save Custom Defaults (This menu will not be available until post platform release)	Lets you load Setup with custom defaults. Clicking on the menu item causes the system to prompt you for a Yes or No response. Yes Loads setup values from a file previously saved through the Save Custom Defaults menu item. You must specify the file name. No Aborts the action.	
Discard Changes	Lets you discard the changed values you have accumulated during this setup session. Clicking on the menu item causes the system to prompt you for a Yes or No response. Yes Discards the setup values for the current setup utility session. No Aborts the action.	

LSI SCSI Utility

The LSI SCSI utility allows you to configure the SCSI capabilities of the server. This configuration utility can be accessed using an EFI-based utility provided by Intel®. This utility is available on the Resource CD.

The EFI utility can be evoked from the EFI shell prompt with the command EFICnfg.efi. From here the SCSI drives can be configured. The utility contains help information at the bottom of each screen. More information on this utility will be documented in a future revision of this document.

■ NOTE

This utility is still being defined and changes may occur in the menus shown below. Entrance into this utility may be updated in a future revision of this document.

To run the LSI SCSI utility:

1. From the EFI Shell, run EFICnfg.efi to enter the LSI Logic SCSI Utility. The following information is displayed on your monitor:

Intel's EFI Configuration program ver 0.6 Serial # Controller description

- 1. OnBoard Function 0 Usb Universal Host Controller
- 2. OnBoard Function1 Usb Universal Host Controller
- 3. OnBoard Function 0 LSI Logic Ultra320 SCSI Controller
- 4. OnBoard Function1 LSI Logic Ultra320 SCSI Controller

Please enter a serial number (Enter 0 to Exit):

2. Select the Function 0LSI Logic Ultra 320 SCSI Controller's serial number (in this case, 3) and press <Enter>.

The Main Menu appears as shown in Figure 14. LSI SCSI Utility Main Menu.



Figure 14. LSI SCSI Utility Main Menu

To select the adapter you wish to configure, use the arrow keys to highlight the adapter then press <Enter>. The screen clears and a message reading "Scanning for devices..." appears.

Figure 15 shows the adapter properties and its different configuration settings.

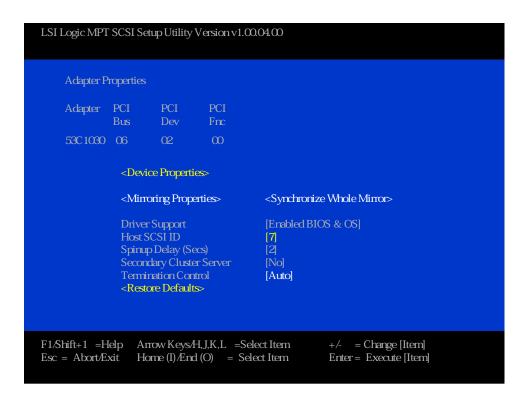


Figure 15. Adapter Properties

The following list shows the available options for each setting category.

Driver Support Enabled BIOS & OS or Enabled OS Only or Enabled BIOS only

or Disabled

Host SCSI ID 0 to 15

SCSI Bus Scan Order Low to High (0..Max) or High to Low (Max..0)

Spin up delay (seconds) 1 to 15 Secondary Cluster Server No or Yes Termination Auto

The <Restore Defaults> option allows you to restore the default configuration of the SCSI adapter.

The <Device Properties> option takes you to the Device Properties menu shown in Figure 16.

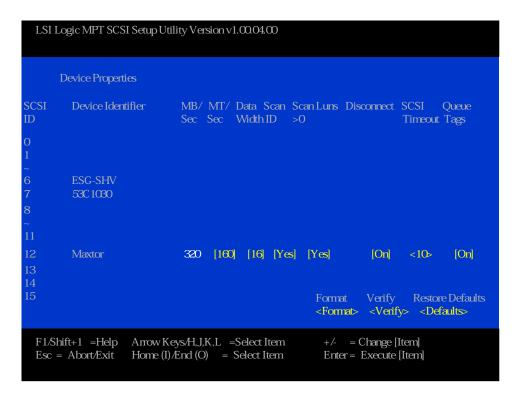


Figure 16. Device Properties

The Device Properties Menu shows options of devices attached to the adapter. It is a large menu and requires the use of the arrow keys to move fully to the left and fully down to see all configuration options. There are "slide bars" (not shown above) to the right and on the bottom to help define your location in the menu. The following list shows the available options for each setting category:

MB/Sec 320

MT/Sec 0 or 5, 10, 20, 40, 80, 160

Data Width 16 or 8
Scan ID Yes or No
Scan Luns >0 Yes or No
Disconnect On or Off
SCSI Timeout <10>
Queue Tags On or Off

Format, Verify, and Restore Defaults are all functions. They are located on the far left of the menu, but are shown below the other configuration options in the figure above. Format and Verify takes you to another menu, see Figure 17 and Figure 18 below. These menus give appropriate warnings and allow you the option of continuing with the function or canceling. Restore Defaults function does not take you another menu and does not give you the option to cancel. If you make changes and then accidentally select the Restore Defaults function, all changes will be discarded.



Figure 17. Device Properties Format Option



Figure 18. Device Properties Verify Option

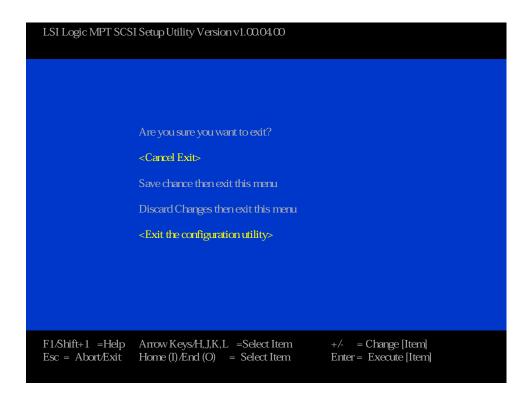


Figure 19. Adapter and/or Device Properties Exit Menu

When exiting the Adapter Properties Menu, if any changes have been made, the Exit Menu appears giving the following three options. Cancel Exit, Save Changes then exit, or Discard changes and exit.

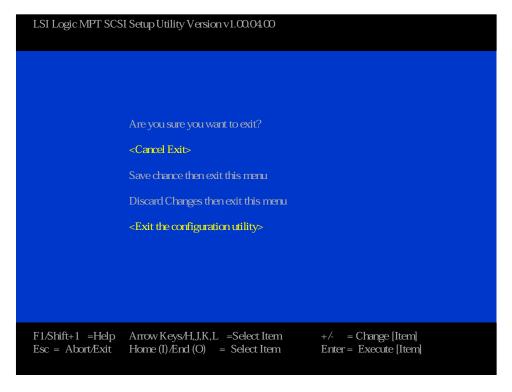


Figure 20. SCSI Utility Exit Menu

When exiting the LSI Logic MPT SCSI Setup Utility, if any changes have been made, the Exit Menu appears giving you these options. Cancel Exit, Save Changes then exit, or Discard changes and exit. The above menu shows the exit menu that appears if no changes have been made to the Setup Utility. After exiting, you are returned to the EFI Shell prompt.

Clearing CMOS



WARNING

Make sure that the rack is anchored securely so it will not tilt forward when the server chassis is extended. A crush hazard exists should the rack tilt forward which could cause serious injury.

You must clear CMOS after you complete the IFlash64 BIOS update. Clearing CMOS involves changing a jumper setting on the I/O riser card, restarting the server with the new jumper setting, restoring the jumper setting to its original position, and restarting the server a final time.

To clear CMOS follow these steps:

(Clearing CMOS by DIP switch)

- 1. Power down the server by pressing and holding the power button on the front control panel. You might have to hold the power button down for several seconds.
- 2. Remove standby power from the server by unplugging both power cords from the system and removing them from the server.
- 3. Remove the screw that secures the non-hot-plug I/O cover over the I/O riser card and slide the cover off
- 4. Remove the I/O riser card by following the procedure described in "Removing the I/O Riser Card".
- 5. Position switch #3 on the five-position DIP switch at location S8A1 to the ON position.
- 6. Replace the I/O riser card by following the procedure described in "Replacing the I/O Riser Card".
- 7. Reinstall the server's power cords and plug them into the power source.
- 8. Power on the server by pressing the power button on the front control panel.
- 9. Wait for the message 'NVRAM cleared by jumper' to appear. When the options 'Hit <F1> to load defaults or <F2> to run SETUP or <ESC> to continue, hit <F1> to load the defaults.

After you clear CMOS, you must restore the switch setting to it's "OFF" position and restart the server. Follow these steps to return the switch to the default position and reboot the system.

- 1. Power down the system by pressing and holding the power button on the front control panel. You might have to hold down the power button for several seconds.
- 2. Remove standby power from the server by unplugging both the power cords from the power source and removing them from the server.
- 3. Remove the I/O riser card by following the procedure described in "Removing the I/O Riser Card.
- 4. Reposition jumper switch #3 on the 5-position switch at location S8A1 so that it is in the "OFF" position.
- 5. Replace the I/O riser card by following the procedure described in "Installing the I/O Riser Card".
- 6. Close and secure the rear part of the top cover.
- 7. Reinstall the power cords and plug them into the power source.
- 8. If the chassis is rack mounted, push the system back into the cabinet rack.
- 9. Power on the server by pressing and holding the power button on the front control panel.

BIOS Recovery Mode

The BIOS Recovery Mode permits re-flashing the BIOS when the flash ROM has been corrupted. The usual sequence of events for automatic recovery is:

- 1. Request recovery media by repeating a low-tone beep with POST code.
- 2. Insert recovery media and reset the system.
- 3. One beep indicates recovery media valid, and flash update started.
- 4. Approximately two minutes later, two beeps indicate flash update complete.
- 5. System automatically resets and starts the new BIOS.

The BIOS Recovery Mode, when using an LS240, is initiated using the following procedure:

- 1. Prior to attempting recovery for the first time, either use a previously formatted unused or a blank LS-240 diskette.
- 2. Unzip the recovery image and copy the S870BN4A.REC file (S870BN4B.REC for Madison) onto the LS-240 diskette. The file S870BN4A.rec should be the only file on the disk.
- 3. With the system switched off and AC power disconnected:
 - a. Place I/O riser toggle switch #1 to the ON position (S8A1) for forced BIOS recovery. For toggle switch location, refer to "I/O Riser Card Settings..
 - b. Insert diskette in LS-240 drive.
 - c. Reconnect the AC power and switch server power on.
 - d. LS-240 diskette activity started.
 - e. One full beep (start load S870BN4A.REC from disk to memory).
 - f. Wait two minutes. No indication of LS-240 activity will be seen until two beeps are heard that indicate the BIOS recovery has completed successfully.
 - g. Remove the LS-240 recovery diskette, switch system power off, and disconnect AC power.
 - h. Replace the I/O toggle switch #1 to the OFF position, reconnect AC power and switch the system on per updated BIOS release notes (i.e. clear CMOS first time booting).

The BIOS Recovery Mode, when using a CD, is initiated using the following procedure:

- 1. Unzip the recovery image and burn the included .iso file to a blank CD. The file S870BN4A.rec should be the only file on the disk.
- 2. With the system switched off and AC power disconnected:
 - a. Place I/O riser toggle switch #1 to the ON position (S8A1) for forced BIOS recovery. For toggle switch location, refer to "I/O Riser Card Settings".
 - b. Reconnect the AC power and switch server power on.
 - c. Quickly insert CD into DVD drive
 - d. LS-240 diskette activity should start.
 - e. There should be one full beep (start load SR870BN4A.REC from disk to memory).
 - f. Wait two minutes. No indication of LS-240 activity will be seen until two beeps are heard that indicate the BIOS recovery has completed successfully.
 - g. Remove the LS-240 recovery diskette, switch system power off, and disconnect AC power.

Replace the I/O toggle switch #1 to the OFF position, reconnect AC power and switch the system on per updated BIOS release notes (i.e., clear CMOS first-time booting).

■ NOTE

The system supports BIOS recovery using CD-ROM or DVD. The recovery image should be copied to the CD in El Torito format.

Using the SEL Viewer Utility

The System Event Log (SEL) Viewer utility is an EFI-based program (SELView.EFI) for viewing the system event log records stored in the non-volatile server management storage device of Intel® Itanium® 2 based servers. The MAXDATA PLATINUM 9000-4R Server supports a non-volatile storage area for the System Event Log of 65,536 bytes (64 KB), and can hold up to 3,276 records.

■ NOTE

You can also run this utility directly from the Resource CD. For information, see "The MAXDATA PLATINUM 9000-4R Server Resource CD."

Using the SELViewer Utility, you can do the following:

- Examine all system event log entries stored in the non-volatile storage area of the server.
- Examine previously stored system event log entries from a file.
- Save the system event log entries to a file.
- Clear the System Event Log (SEL) entries from the non-volatile storage area.
- Sort the SEL records by various fields such as Timestamp, Sensor Type Number, Event Description, and Generator ID.
- Display the SEL records in textual, interpreted, or raw hex format, as read from the server.

Running the SELViewer Utility

Follow these steps to run the SELViewer Utility:

- 1. Boot to the EFI Shell. For information on how to boot the server, refer to "The Extensible Firmware Interface (EFI) Shell."
- 2. Copy the following files to a removable media device or to the hard drive.

```
selview.efi
ipmi.efi
selenus.str
selenus.hlp
sel.ini
IPMIdriver.txt
selview.txt
```

- 3. Read the release notes for the SELViewer Utility (selview.txt). These release notes may contain special instructions for running the utility.
- 4. Load the IPMI driver by typing the following command:

```
load ipmi.efi
```

■ NOTE

The IPMI driver file name might change independently of the SELViewer Utility. Also, if you have already loaded an IPMI driver, you do not need to load it again unless you have reset or power cycled the system.

5. Run the utility by typing the following command at the EFI shell prompt:

Selview <Enter>

- 6. Use the <Tab> or <F10> key to switch between the pull down menu and the display pane.
- 7. Use <F5> and <F6> function keys to tab across the columns in the text mode display.

■ NOTE

You can find more detailed instructions on how to use the SELViewer Utility by using the Help menu.

Splash Screen

A splash screen is displayed when the utility is first invoked and the splash screen file is available to the utility at run-time. The Splash Screen for SEL Viewer is loaded from a file whose filename is determined by looking in the SEL.INI file. The default file name, if not found in the INI file, is SELENUS. SPH. The splash screen file is read by the utility and displayed on the screen. If this file is not a valid splash screen file, the utility does not display it, nor does it display any error messages.

The splash screen is automatically dismissed after five seconds, or when you press any key. "Appendix D INI File Format" describes how OEMs, desiring to have their own splash screen, can create these files.

Graphical User Interface

The SEL Viewer main window is shown in Figure 21. The data displays in columns as follows:

- Count of the system event being displayed. Starting with 1, and increasing by one for each event. The title of this column is "Num."
- Timestamp.
- Sensor type and number.
- Event description (based on IPMI Specification and BIOS EPS).
- Generator ID.

When the utility is first invoked, it loads the SEL records from the server. The status box, shown in Figure 22, is displayed to indicate that the SEL Viewer is loading SEL records from the server. All SEL record information is displayed as one system event per row. The interpretation of the event, event type, and event data is presented in the Event Description column. If there are no entries in the SEL, a message is displayed as shown in Figure 23.

The Viewer displays the event logs in an interpreted, easy-to-understand textual form. It requires the associated .STR and .HLP files for the current language and locale. The SEL Viewer parses the .STR file to get the appropriate string messages that are displayed in the program. Since .STR is a Unicode file, it allows internationalization of the SEL Viewer.

The SEL Viewer can display event logs in raw hexadecimal format as read from the server. Figure 24 shows SEL records displayed in hexadecimal format. Table 17 explains the abbreviations used in the hexadecimal mode display.

Table 17. Abbreviations Used in Hex Mode Display

RID	Record ID
RT	Record Type
TS	Time Stamp
GID	Generator ID
ER	Event Message Format Revision
ST	SensorType
SN	Sensor Number
EDIR	Event Dir and Event Type
ED1	Event Data 1
ED2	Event Data 2
ED3	Event Data 3
MID	Manufacturers ID (used when displaying OEM SEL records type C0h-DFh)
OEM	OEM defined (used when displaying OEM SEL records type C0h-DFh and E0h-FFh)

The SEL Viewer main window contains a display window that displays all the SEL records. It also contains a pull-down menu, used for selecting the functions available in the SEL Viewer. You can move between the display window and pull-down menu using the function key <F10>. From the menu, you can use the arrow keys to move around the various menu items, and use return key to select a particular menu item. A brief help message about the option selected from the menu is displayed at the bottom of the SEL Viewer main window.

The display window supports arrow keys, <PgDn>, <PgUp>, <Home>, and <End> keys to pan across the display window. It also supports the <F5> key to move forward between columns and <F6> to move backwards.

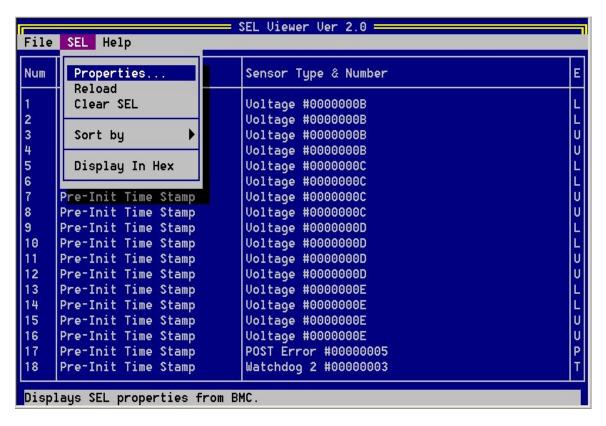


Figure 21. SEL Viewer Utility Main Window



Figure 22. Status Box



Figure 23. Message for Empty Event Log

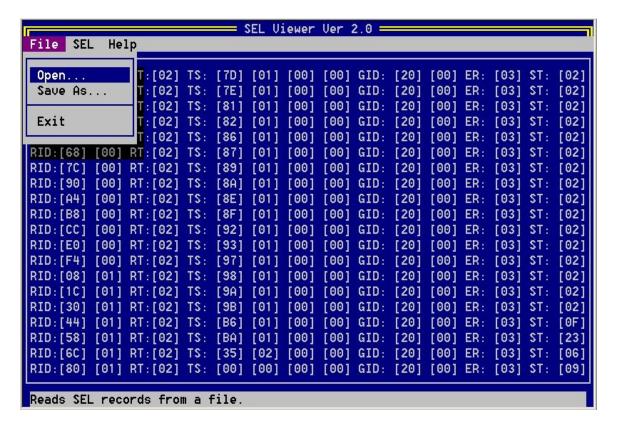


Figure 24. SEL Records Displayed in Hex Format

Pull-Down Menu – File

The File pull-down menu includes options for opening and saving system event records from, and to data files, respectively. These options are further described in the sections below.

File Menu Item - Open

This option allows you to open an existing SEL data file for viewing. Selecting this option prompts you to specify a filename having the "sel" file name extension. The SEL file is displayed on the original mode that it was saved on either raw hexadecimal or interpreted format.

The Open dialog box provides you with the ability to browse drives and directories for existing files, as shown in Figure 25. If the selected file cannot be opened, this program displays error messages accordingly.

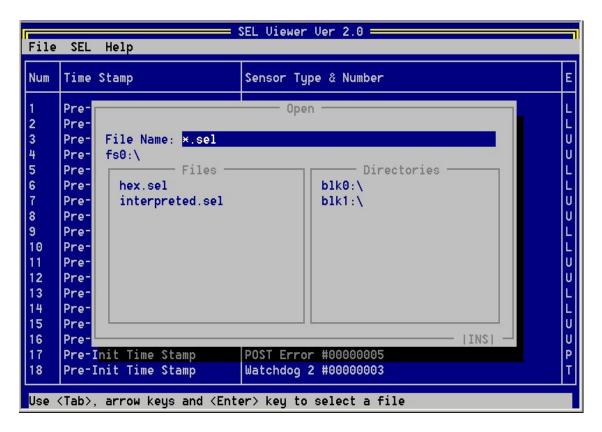


Figure 25. File Open Window

File Menu Item - Save As

This option allows you to save the SEL data to a file, with the "sel" file name extension, either in interpreted text format or in raw hex format, depending on the mode in which records are currently displayed.

The interpreted text format files contain the SEL properties in the first lines followed by a blank line and the column headings. The SEL file format is specified as an ASCII-readable file, with each field delimited to a TAB and each system event ending with a carriage return/line feed. The columns might not line up to allow for this file to be opened by programs such as Microsoft® Excel.

The raw hex format files also contain the SEL properties in the first lines followed by a blank line. These files contain the SEL records in raw hexadecimal format, as read from the server. This SEL file format is specified as an ASCII-readable file, with each system event ending with a carriage return/line feed.

This option also provides you with the ability to select drives and directories by browsing, as shown in Figure 25. If the SEL data cannot be saved or the file cannot be created or overwritten, the program displays error messages accordingly.

File Menu Item - Exit

This option allows you to exit the utility.

Pull-Down Menu - SEL

The SEL pull-down menu includes options for reloading SEL entries from the server, clearing the SEL entries, viewing SEL properties, and sorting the entries by different column fields. These options are further described in the sections below.

SEL Menu Item - Reload

This option allows you to reload the SEL entries from the server. This operation is similar to the one performed when the SEL Viewer is first invoked. The records are displayed either in the hex format or in the interpreted format, depending on the set display mode. The status box shown in Figure 22 is displayed to indicate that the SEL Viewer is loading SEL records from the server, and the message shown in Figure 23 is displayed if the SEL is empty.

SEL Menu Item – Properties

This option allows you to view the SEL properties as shown in Figure 26. The text "Warning: System Event Log is FULL" is displayed if the SEL is full; otherwise, the text is omitted. The "Number of Entries" and "Free Space Remaining" are displayed as decimal values.

```
SEL Properties

IPMI Version : 1.0

Number of Entries : 229

Last Add Time : 02/14/2001 - 23:05:51

Last Erase Time : 02/14/2001 - 03:51:40

Free Space Remaining : 3608
```

Figure 26. SEL Properties

SEL Menu Item - Clear SEL

This option clears the SEL entries from the non-volatile storage area of the server as well as the entries from the main window table. A dialog message prompts you for the confirmation of clearing the SEL, as shown in Figure 27.



Figure 27. Confirmation for Clearing SEL

SEL Menu Item – Display In Hex / Display In Text

This option allows you to toggle between the raw hexadecimal mode display and the interpreted mode display. In hex mode display, all the SEL records are displayed in raw hex format as shown in Figure 24. In interpreted mode display, all the SEL records are decoded and displayed in text format, as shown in Figure 21. The menu item name toggles between "Display in hex" and "Display in text" to allow changing from one display mode to the other. When the display mode is changed, SEL Viewer automatically loads the SEL entries from the server, and displays it in the new display mode. Display mode is toggled between text and hex, automatically, when the SEL entries are read from a file, depending on whether the file contains hex data or text data.

SEL Menu Item - Sort By

This option allows the SEL entries, displayed in the SEL Viewer main window, to be sorted by different fields. This option, when selected, presents you with a list of fields by which the entries can be sorted. Upon choosing the appropriate field, sorting is done by that field.

Pull-Down Menu - Help

The help menu displays detailed information about the program usage. It also displays the utility version information and IPMI driver version number.

Help Menu Item - General Help

This option displays a detailed description on how to use the SEL Viewer, as shown in Figure 27. The help window is divided into two windows. The top window lists all the main topics and the bottom one displays the description about the topic currently selected. Users can select different topics using the arrow keys. To move between windows, use <F10> or <Tab> keys. To dismiss the help window, press <Esc> key.

Help Menu Item - About

This option displays utility version and copyright information about this utility. It also displays the IPMI driver version that is currently loaded.

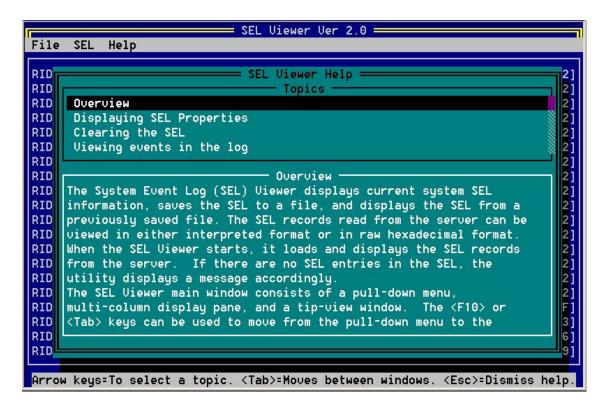


Figure 28. Help Window

Command Line Interface

This utility parses the command line arguments and sets internal flags to control operation. Any invalid parameters will result in a "usage" message being displayed and the program exiting with an error code (see Appendix D).

The command line options are listed in Table 18 and are accessed with the forward slash "/" character. The basic command line format is:

Selview [Options]

Table 18. Command Line Switches

Parameter	Description
Selview	The name of the utility.
[File Name]	Output file name (and path) used for saving SEL entries. This option is used in conjunction with "/save".
/clear	Clear SEL entries from the non-volatile storage area. This option can not be used with any other option.
/save	Save SEL entries to a file; entries are saved in interpreted text format by default. If file exists, it is overwritten with the new SEL entries. This option also requires a file name; that is, the [File Name] option.
/hex	SEL entries are saved to a file in hex format instead of interpreted text format. This option is used in conjunction with "/save".
/h or /?	Displays command line help information.

System Maintenance Utility

The System Maintenance Utility is an EFI-based program that provides the ability to view or modify server management firmware configuration settings. The firmware configuration is maintained by the BMC. The executable program for the SMU is named smu.efi.

The SMU lets you:

- Configure serial/modem channels for remote server management over a modem or direct serial connection.
- Configure LAN channels for remote server management over the network.
- Configure users and associated passwords that are allowed access to the channels. Users and channels can also be assigned privilege levels to further define who can access them.
- Configure platform events to define what actions should take place when specific events occur.
- Configure serial over LAN and terminal mode capabilities.

Remote SMU Keyboard Support

The remote SMU application requires a pointing device for operation; it does not support accelerator keys. Other keys work as defined in Table 19.

Table 19. Keyboard Support for Remote SMU Client

KEY	FUNCTION
<enter></enter>	Pressing the <enter> key when focus is on a button causes the action associated with that button to occur.</enter>
<tab></tab>	Moves focus to the next control in the tab order in the primary information pane.
<shift><tab></tab></shift>	Moves focus to the previous control in the tab order.

Local SMU Keyboard Support

The local SMU application provides keyboard support as follows:

- <Tab> key Moves input focus to the next selectable control in the currently active pane.
- <UP arrow> key Moves input focus to the previous selectable control in the currently active pane.
- <DOWN arrow> key Same as the <Tab> key.
- <RIGHT arrow> key Same as the <Tab> key.
- <LEFT arrow> key Same as the <UP arrow> key.
- <Enter> key If an edit box has focus, pressing the <Enter> key has the same effect as pressing the <Tab> key. When the focus is on a task menu item, a task button, a radio button, or a checkbox, pressing <Enter> selects the control as if the control were clicked with the left button on a mouse. If focus is on a single-select control (combo box), pressing <Enter> has no effect.
- <F5> key If there is a horizontal scroll bar in the active pane, pressing <F5> scrolls the
 display left.
- <F6> key If there is a horizontal scroll bar in the active pane, pressing <F6> scrolls the display right.
- <F7> key If there is a vertical scroll bar in the active pane, pressing <F7> scrolls the display up.
- <F8> key If there is a vertical scroll bar in the active pane, pressing <F8> scrolls the display down.
- <F10> key Toggles the focus between the task pane and the primary information pane.
- <ESC> key Causes exit dialog to appear; provides another way to exit the SMU.

The following also hold true when using the above keys while running the local SMU application:

- For single-select controls (combo boxes), the <UP arrow> and <DOWN arrow> keys can be used to traverse the items in the list. To move to a different control, the <TAB>, <LEFT arrow>, or <RIGHT arrow> key must be used.
- For a set of grouped radio buttons (only one can be chosen), the <UP arrow>, <DOWN arrow>,
 <LEFT arrow>, and <RIGHT arrow> keys can be used to move between buttons in the group.
 To move to a different control, the <Tab> key must be used.
- For edit box controls, the <LEFT arrow> and <RIGHT arrow> keys can be used to move the
 cursor within the edit box. To move to a different control, the <Tab>, <Enter>, <UP arrow>, or
 <DOWN arrow> key must be used.

About Box Information

The local and remote SMU containers both contain an "About" item in the task pane when the task list is displayed. When About is clicked, a dialog box is displayed showing information about the SMU application version. The information displayed consists of a set of four numbers, defined as follows: a major feature release number; a minor platform or maintenance release number; a variant, used for things like different operating systems or languages; and a build number. An example of the About box display is shown in Figure 29.



Figure 29. SMU Application About Box (Application version information)

The About box also contains an Advanced button that can be used to show version information for components related to the SMU application. An example of this dialog box is shown in Figure 30.

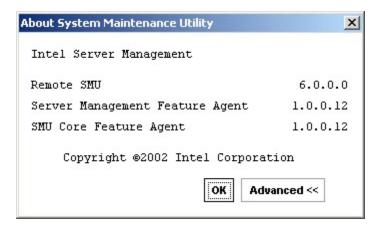


Figure 30. SMU Application About Box (Related component information)

SMU Application Startup and Shutdown

This section describes the following items:

- Installation of SMU software.
- Discovery of servers that support the SMU.
- The steps that occur when the local and remote SMU applications are started, along with describing any user input necessary in each case.
- Determination of a connection path for a remote SMU session.
- How to shut down the local and remote SMU applications.
- Error conditions and handling during startup and shutdown.

Installation of SMU Software

The installation of the remote SMU application software is part of the ISM installation process. This results in the SMU files being copied to a directory specified during that installation process.

The installation of the SMU core components occurs as part of the installation process for the service partition software. The service partition software is installed using the system resource CD supplied with the server. Note that a system partition is created and installed as part of the procedure to install the service partition software. It is possible to run the SMU local application from a CD without installing a service partition.

Discovery of Servers That Support the SMU

Running the remote SMU application requires that the Intel® Server Management software be installed on the client system. When the ISM software is run, it performs a discovery of all servers that support tools available within ISM. The discovered servers are displayed in the ISM Console. By clicking on a server name in the table, a list of tools supported on that server is displayed. The SMU is contained in the set of tools listed under the heading Reboot to Service Partition.

Figure 31 below shows the ISM Console with the supported tools shown for a server.

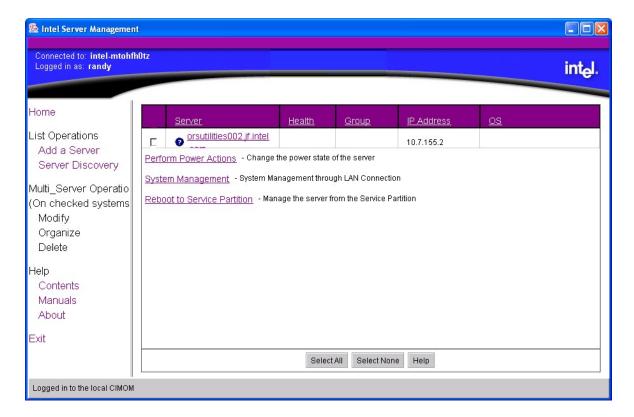


Figure 31. ISM Console

Connections Between SMU Applications and Core Components

Remote

The path used to connect to a target server is defined by the ISM software based on information it has about each server. Currently, the only supported connection path is LAN. After a connection is established between the remote SMU application and SMU core components running on a server over some physical medium, the application and the core components set up a socket connection to communicate over that medium.

Local

In the local case, the local SMU application and the core components exchange XML documents using a procedural interface. There is no socket connection between the application and the core components.

Startup of the Remote SMU Application

The sequence of steps that occur when starting up the remote SMU application is listed below. Note that these steps occur under the control of the ISM software, not the SMU software, so all error handling during this time is done by the ISM software. For details on this error handling, refer to the appropriate ISM documentation.

The user clicks the "Reboot to Service Partition" entry in the list of tools for a server shown in the ISM Console.

The login screen for the Service Partition Utilities then appears (see Figure 32). At this view, the username and password for an out-of-band connection should be entered, and the Login button clicked.

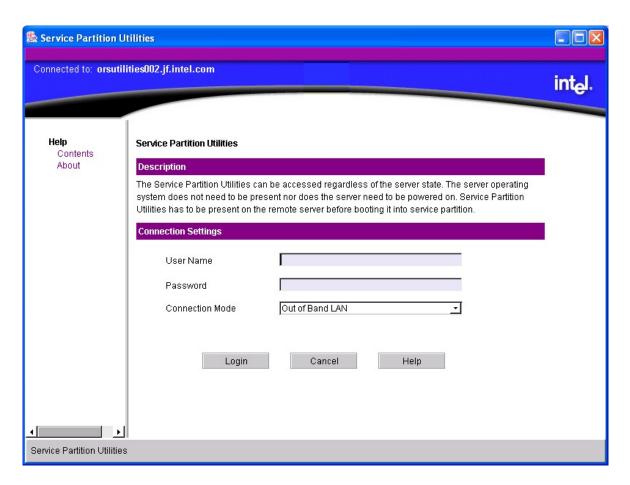


Figure 32. Service Partition Connection View

When the server has been successfully rebooted to the service partition software, a screen appears showing the supported service partition utilities (see Figure 33). Clicking on "System Maintenance Utility" causes the remote SMU application to be launched. ISM passes connection information to the SMU so the SMU can talk to the target server. Note that up to this point all errors are handled by the ISM software, not the SMU, so the appropriate ISM document should be referenced with regard to the types of errors that can occur and the actions taken if such errors take place.

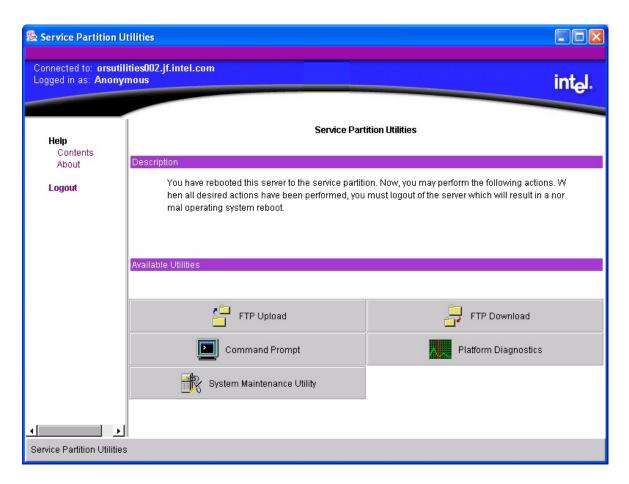


Figure 33. Service Partition Utilities

The remote SMU application then uses Service Partition Utilities services to execute the server-side SMU core components. The remote SMU application attempts to establish a socket connection to the server on an agreed upon socket. The application waits for a predefined amount of time (up to several seconds) before indicating to you that it failed to establish a connection. If a connection is established, the application sends information to the SMU core components to request a session. If the connection fails, a dialog box similar to Figure 34 is displayed:



Figure 34. Socket Connection Error Message

When the user clicks "OK", the remote SMU application will close. The user can attempt to restart the SMU from the ISM console if desired.

If the session with the SMU core components is established, a version check is made to determine if the remote SMU application is able to communicate with the SMU core components on the server (i.e. that the application and core components can understand the messages sent to each other without problems occurring). If the versions do not match, the message shown in Figure 35 is displayed:



Figure 35. SMU Version Compatibility Error

When "OK" is clicked, the Java SMU application is closed and control is returned to the Service Partition Utilities application. The SMU cosre components exit on the server and control returns to an EFI prompt.

If a session can be set up and the SMU application and core components are the same version, the core components send task information and the SMU home view that the remote SMU application displays in the task pane and primary information pane, respectively. The SMU home view directs you to select a task from the task pane. The SMU home view is shown in Figure 36.

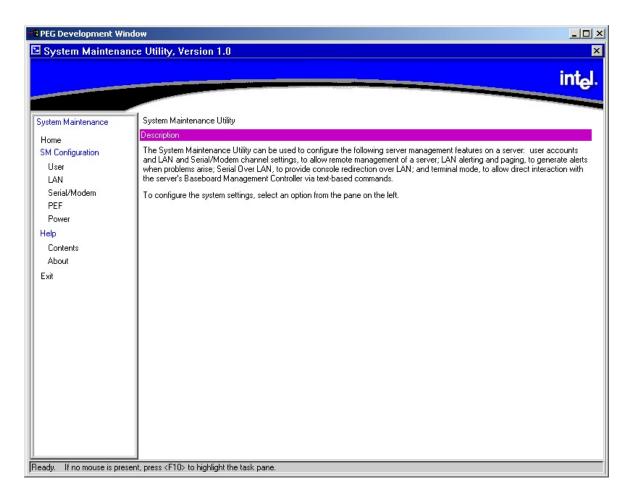


Figure 36. SMU Home View

Startup of the Local SMU Application

The local SMU application can be run either from the system resource CD or, if the SMU software has been installed locally, from the directory where it was installed on the system partition. Note that if the SMU software has been installed locally, it can still be run from the CD.

Running from CD

The target server must have a CD drive (EFI currently only supports CDs that contain information in the "EITorito" format). No network connection is required.

The following sequence of steps must be followed to start the SMU locally (assuming the system resource CD is being used):

- 1. Insert the system resource CD into the CD drive on the target server and boot the server to the EFI shell. The Resource CD menu program starts running automatically and displays a splash screen followed by its main menu.
- 2. Use the arrow keys to navigate to the "Utilities" menu item. Press the <Enter> key.
- 3. Use the down arrow key to highlight the System Maintenance Utility menu item. Press the <Enter> key. This causes the local SMU application (smu.efi) to be started.

Running from the System Partition

If the SMU has been installed on a system partition, it can be run from there. To do this, follow the steps below:

- 1. If an EFI shell prompt is available on the local console and the files on the system partition can be accessed, skip to step 3.
- 2. Reset the server and boot to the EFI shell.
- 3. Locate the filesystem (e.g., fs0:, fs1:) that contains the service partition software and change directory to \efi\service\smu.
- 4. Run the smu.efi application.

Shutdown of the SMU Application

Both the local and remote SMU applications can be exited by clicking on the Exit item in the task pane or by clicking the Close button in the upper right hand corner of the container. A user can also use the Close choice in the system menu of either container. An exit operation can be started at any time (unless the application is blocked waiting for a response from the server). During exit from the SMU application, the following steps occur:

- 1. The application sends a message to the SMU core components requesting to end the SMU session.
- 2. The SMU core components send a message back to the application asking for user confirmation of the request to exit. This message is displayed as a dialog box with an "OK" button and a "Cancel" button.
- 3. Clicking the "OK" button causes the SMU application to send another message to the server indicating you want to exit.
- 4. One last message is sent back to the application from the server before the application shuts down. In the local case, when the SMU application exits, it exits to the EFI shell so an EFI shell prompt is displayed. In the remote case, when the remote SMU application is exited, control is returned to the Service Partition Utilities application (refer to Figure 33).
- 5. If the "Cancel" button is clicked, you are able to continue the current SMU session.

Server Management Configuration Task

The server management configuration task, if supported on the server the SMU application is connected to, appears in the task pane. This task allows you to configure server management settings maintained by the server management controller of the server, usually the Baseboard Management Controller. To support this task, the target server must support version 1.5 of the Intelligent Platform Management Interface (IPMI 1.5).

The server management configuration task supports configuration of the following (listed as subtasks in the task pane):

- Users
- LAN Channel
- Serial/Modem Channel
- Platform Event Filtering (PEF)
- Power Settings

Upon selecting one of the above subtasks in the task pane, a view is displayed containing some or all of the configuration items that pertain to the selected subtask. The data that is initially displayed in this view is read from the server management controller of the server. You can then update the settings and save them back to the server.

Note that subtasks can be made up of one or more views, depending on the server management configuration settings enabled by you as the views are displayed. Most views contain common buttons to perform specific operations. Buttons that are common to all views regardless of the task (Back, Next, Cancel) are described in the Remote SMU Keyboard Support and Local SMU Keyboard Support sections. Buttons that are specific to the server management configuration task are described in Table 20. All buttons appear at the bottom of the view.

Note that all views shown in this chapter are what would be shown in the primary information pane of either the local or remote application; the entire container is not shown in these views.

Table 20. Common Buttons in SM Configuration Views

Button	Description
Save	Causes the current values of the settings in the current subtask to be stored in non-volatile memory on the server.
Edit	Causes a view to be displayed that allows a user to change settings related to a single entry in a table.

LAN Channel Configuration Subtask

The LAN channel configuration subtask allows a user to modify settings related to the LAN channel.

LAN Channel Configuration Initial View

The initial view for configuring the LAN channel is shown in Figure 37. The configuration settings are described below.



Figure 37. LAN Channel Configuration

Access Mode

This option is used to configure the access mode for the LAN channel. The available options are described below.

Always Available

The channel is dedicated to communication with the BMC and is available during all system states (powered-down, powered-up, pre-boot, sleep, run-time, etc.).

Disabled

The channel is disabled from being used to communicate with the BMC.

Privilege Level Limit

This setting determines the maximum privilege level at which communication on the channel can take place. It is a global privilege level that takes precedence over user privilege levels, so that if a channel privilege level is set at User level, for example, then users can only execute user-level commands, even if the user privilege level is set higher than User.

The meanings of the different privilege levels are described below:

Callback

Only commands needed to initiate a callback session are allowed. Note that although ISM software does not currently support callback as a connection mechanism, it is still a valid privilege level because it defines a set of BMC commands that can be executed by a user.

User

Only "benign" commands are allowed. These are primarily commands that read data structures and retrieve status. Commands that can be used to alter BMC configuration, write data to the BMC or other management controllers, or perform system actions such as resets, power on/off, and watchdog activation are disallowed.

Operator

All BMC commands are allowed, except for configuration commands that can change the behavior of the out-of-band interfaces. For example, Operator privilege does not allow the capability to disable individual channels, or change user access privileges.

Administrator

All BMC commands are allowed, including configuration commands. An administrator can even execute configuration commands that would disable the channel that the Administrator is communicating over.

Enable DHCP

The Enable Dynamic Host Configuration Protocol (DHCP) setting enables the dynamic host configuration protocol to allow the server to automatically assign the Host IP address, Default Gateway IP address and Subnet Mask.

Note that when this option is enabled, the Host IP Address, Subnet Mask, and Default Gateway IP Address edit boxes are grayed out (disabled). The system must be reset in order for this setting to take effect.

Host IP Address

The Host IP Address is the logical or Internet address of the host. This IP address is required when DHCP is disabled. The IP address is entered as a dotted notation, e.g., 192.168.0.2.

Subnet Mask

The Subnet Mask is the host's subnet mask. The server uses this to decide if alert destinations are in the local subnet or in another subnet relative to the client console. The Subnet Mask is required when DHCP is disabled. The Subnet Mask is entered as a dotted notation, e.g., 255.255.0.0.

Default Gateway IP Address

The Default Gateway IP address is the IP address of the router used when the BMC sends a message or an alert to a system on a different subnet than the BMC is on. It is required when DHCP is disabled. The IP address is entered as a dotted notation, e.g., 192.168.0.2.

Default Gateway MAC Address

This edit box allows a user to enter the MAC address of the default gateway router. The MAC address is entered as a series of six pairs of hex digits separated by dashes, e.g. 00-01-62-d0-3e-66. Alphabetic hex digits (a-f) can be entered in uppercase or lowercase. This edit box is grayed out by default and is only activated if the checkbox to allow gateway MAC addresses to be resolved automatically is not checked. If the edit box is cleared (no address is supplied), a message is displayed asking that a valid address be entered. This edit box is also disabled if DHCP is enabled.

Automatically Resolve Default Gateway MAC Address

This checkbox allows you to specify whether the BMC should attempt to resolve the MAC address of the default gateway router automatically. If unchecked, the assumption is that you are entering the MAC address in the edit box provided. If the checkbox is checked and the BMC cannot resolve the MAC address, you will be informed of this and asked to provide the MAC address in the edit box provided in this view. The view is redisplayed with this checkbox unchecked. Any user data previously entered remains in the view.

This checkbox is checked by default unless the MAC address edit box appears to have a valid MAC address. A MAC address of 00-00-00-00-00-00 is considered invalid, so the checkbox would get checked when the SMU displays the view in that case. If the checkbox is unchecked, the default gateway MAC address edit box becomes active (it is grayed out when this checkbox is checked). If it is still checked when the OK button is clicked, the firmware immediately attempts to resolve the gateway MAC address. If it cannot be resolved, a message is displayed to you stating that the address cannot be resolved and that the MAC address should be entered. This checkbox is also disabled if DHCP is enabled.

Backup Gateway IP Address

This edit box allows a user to enter the IP address of a backup gateway router. The IP address is entered as a dotted notation, e.g., 192.168.0.2.

Backup Gateway MAC Address

This edit box allows a user to enter the MAC address of the backup gateway router. The MAC address is entered as a series of six pairs of hex digits separated by dashes, e.g. 00-01-62-d0-3e-66. Hex digits can be entered in uppercase or lowercase. This edit box is grayed out by default and is only activated if the checkbox to allow gateway MAC addresses to be resolved automatically is not checked. If the edit box is cleared (no address is supplied), a message is displayed asking that a valid address be entered.

Automatically Resolve Backup Gateway MAC Address

This checkbox allows you to specify whether the BMC should attempt to resolve the MAC addresses of the backup gateway router automatically. If unchecked, the assumption is that you are entering the MAC address in the edit box provided. If the checkbox is checked and the BMC cannot resolve the MAC address, you will be informed of this and asked to provide the MAC address in the edit box provided in this view. The view is redisplayed with this checkbox unchecked. Any user data previously entered remains in the view.

This checkbox is checked by default unless the MAC address edit box appears to have a valid MAC address. A MAC address of 00-00-00-00-00-00 is considered invalid, so the checkbox would get checked when the SMU displays the view in that case. If the checkbox is unchecked, the default gateway MAC address edit box becomes active (it is grayed out when this checkbox is checked). If it is still checked when the OK button is clicked, the firmware immediately attempts to resolve the gateway MAC address. If it cannot be resolved, a message is displayed to you stating that the address cannot be resolved and that the MAC address should be entered.

Default LAN Configuration Settings Set by the SMU

The SMU also sets some server management firmware settings that are not exposed to you. The list of these settings are given below: Note that for these settings to be set by the SMU, you must click the Save button on the last LAN configuration view.

Gratuitous ARPs may be enabled

This setting allows the BMC to generate gratuitous ARPs, which provides a mechanism for IP devices to locate the hardware addresses of other devices on the local network. If the server has a valid IP address and the LAN channel is enabled for messaging (the access mode is not set to Disabled) or alerting, then gratuitous ARPs are enabled.

Authentication enables are enabled

These bits define what types of authentication are enabled to authenticate messages sent to the BMC by users of different privilege levels. The SMU enables authentication of type straight password, MD2, MD5, and none. (Refer to the IPMI specification for more information on these authentication types.)

User-level authentication is disabled

The SMU disables user-level authentication so that if a user is attached with a privilege level of User, no authentication is done on messages sent to or from the BMC. This speeds up the performance of the session.

LAN Alert Configuration

The LAN Alert Configuration view (see Figure 38) shows all currently configured destination IP addresses for LAN alerts and their associated settings. If no IP addresses are currently configured as alert destinations, the Edit and Delete buttons are grayed out.

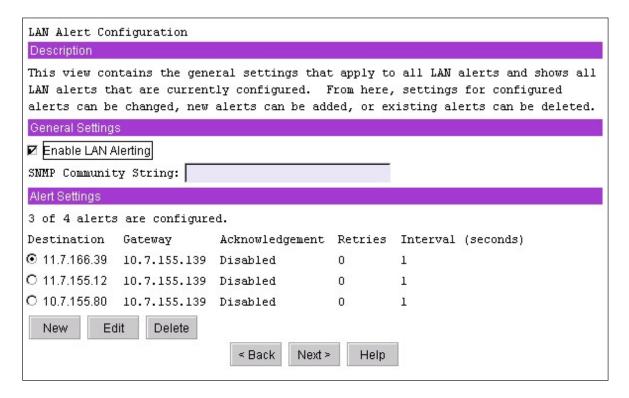


Figure 38. LAN Alerting Configuration

Enable LAN Alerting

This checkbox is used to enable or disable alerts on the LAN channel.

SNMP Community String

This edit box is used to enter string that is entered in the Community String field for Platform Event Traps (PETs). This string can optionally be used to hold a vendor-specific string that is used to provide the network name identity of the system that generated the event. This string is 18 bytes maximum and it is typically set to "public." This string cannot be null.

Alert Settings

When one or more IP addresses are configured as alert destinations, this section shows those addresses along with the following associated configuration settings:

- Gateway IP address for the destination IP address.
- Whether alert acknowledge is enabled for the alerts sent to this destination.
- The number of times the alert will be retried.
- The interval in seconds between retries.

The number of LAN alert destinations is platform specific. For the MAXDATA PLATINUM 9000-4R Server, the number of LAN alert destinations is 4.

New, Edit, and Delete Buttons

If the New button is clicked, a view is displayed to allow configuring of a new LAN destination address; refer to the following section. If the Edit button is clicked, a view is displayed to allow editing of the configuration for the currently selected destination IP address (the address whose radio button is selected in the list). The Delete button is clicked to delete the currently selected destination IP address (the one whose radio button is selected in the list). Before deleting, you are shown a popup dialog box to confirm the delete operation. If OK is clicked, the LAN Alerting Configuration view is redisplayed with the deleted address no longer shown. If no alerts are currently configured, only the New button is enabled. Note that these buttons only affect the copy of the firmware data internal to the SMU. Any changes are only written to non-volatile storage in the firmware when the Save button in the last LAN configuration view is clicked.

New/Edit LAN Alert View

This New/Edit LAN Alert View shown in Figure 39, allows you to configure or change the settings related to an IP address that is to receive alerts. The view is displayed to configure a new alert destination or edit an existing one is the same except that when editing an existing alert destination, the current settings read from the firmware are shown in the view.

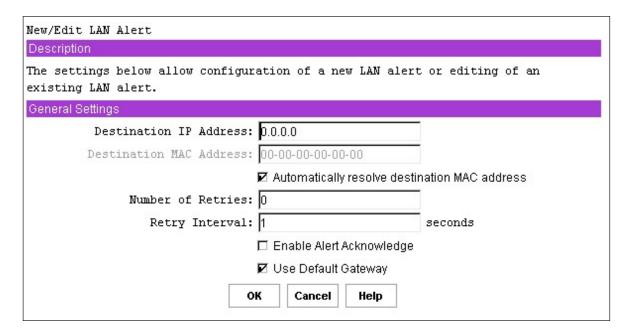


Figure 39. New/Edit LAN Alert View

Destination IP Address

This edit box allows a user to enter the IP address to which an alert is to be sent. The IP address is entered as a dotted notation, e.g., 192.168.0.2. The SMU does not check whether an IP address entered by you matches one previously entered.

Destination MAC Address

If the destination IP address is outside the subnet that the server is on, this edit box is used to enter the MAC address of the destination machine to which the alert should be sent. The MAC address should be entered as a series of six pairs of hex digits separated by dashes, e.g. 00-01-62-d0-3e-66. Alphabetic hex digits (a-f) can be entered in uppercase or lowercase. This edit box is grayed out by default and is only activated if the checkbox to allow gateway MAC addresses to be resolved automatically is not checked.

Automatically Resolve Destination MAC Address

This checkbox allows you to specify whether the BMC should attempt to resolve the MAC address of the destination machine automatically. If unchecked, the assumption is that you are entering the MAC address in the edit box provided. If the checkbox is checked and the BMC cannot resolve the MAC address, you are informed of this and are asked to provide the MAC address in the edit box provided in this view. The view is redisplayed with this checkbox unchecked. Any data previously entered remains in the view.

This checkbox is checked by default. If it is unchecked, the destination MAC address edit box becomes active (it is grayed out when this checkbox is checked).

Number of Retries

This edit box allows a user to enter the number of times to retry sending an alert to a given destination. If set to 0, no retries will be done; the alert is only sent once. If the option is enabled, the alert will only be retried if a timeout occurs while waiting for the acknowledge. If alert acknowledge is enabled, then retries are only done if a timeout occurs waiting for the acknowledge. If alert acknowledge is disabled, the number of retries is the number of times an unacknowledged alert is sent out.

Retry Interval

This edit box is used to set the retry interval, in seconds, when sending an alert or to set the acknowledge timeout when alert acknowledge is enabled. The recommended default is 3 seconds. This value is ignored if alert acknowledge is disabled. This setting can have a value from 1 to 255 inclusive.

Enable Alert Acknowledge

This checkbox should be checked if the destination IP address should send an alert acknowledge when an alert is received. If this checkbox is checked, then an alert is only assumed to have been successfully sent if an acknowledge is received.

Use Default Gateway

This checkbox should be checked if the IP address entered as the default gateway IP address for the LAN channel (on the first LAN configuration view) should be used as the gateway for this destination IP address. If this checkbox is not checked, the backup gateway IP address is used as the gateway IP address. If no backup gateway was specified when the LAN channel configuration was done, this checkbox will not be displayed.

Serial Over LAN Configuration View

The serial over LAN view shown in Figure 40 allows configuring the operation of the serial over LAN capability of the BMC.

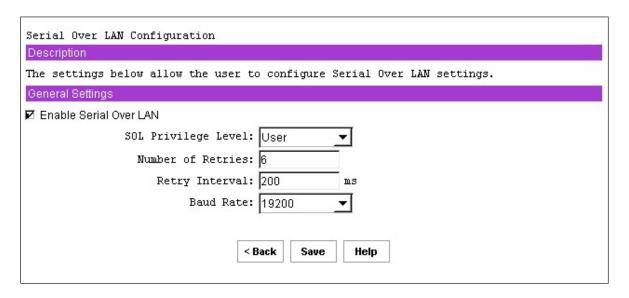


Figure 40. Serial Over LAN Configuration View

Enable Serial Over LAN

This checkbox is used to enable or disable the serial over LAN capability.

SOL Privilege Level

This setting is used to select the minimum operating privilege level that is required to be able to activate SOL. The choices are User, Operator, and Administrator.

Number of Retries

This setting sets the number of times the BMC attempts to resend an SOL message to a remote console. The number of retries must be in the range 0-7 inclusive.

Retry Interval

This setting sets the number of milliseconds that the BMC waits between retries of SOL messages to a remote client. The value that can be entered must be in the range from 0-2559 inclusive. Note however, that the SMU truncates the digit in the ones column from any input number since the firmware keeps track of this value in 10 millisecond intervals. So, for example, any value entered between 0-9 shows up as 0.

Baud Rate

This setting sets the baud rate at which serial data is transferred by the BMC when SOL is active. The choices are Default IPMI, 9600 bps, 19.2 kbps, 38.4 kbps, 57.6 kbps, or 115.2 kpbs. If Default IPMI is chosen, the baud rate used is the rate currently set for BIOS serial redirection. Note that when SOL is active, serial communication with the BMC always occurs with 8 data bits, no parity, 1 stop bit, and RTS/CTS (hardware) flow control.

Default SOL Settings

The SMU by default sets up the SOL configuration such that SOL packets do not have to be authenticated. This enhances the performance of an SOL session.

User Configuration Subtask

The User Configuration subtask provides a mechanism for configuring the user access to the LAN and Serial/Modem channels. Some of the options presented in these views are dependent on how the channels have been configured; therefore, the channels should be configured before you access settings (this is not enforced by the software, though).

User Configuration Initial View

After clicking on the User Configuration subtask, the first view displayed is shown in Figure 41. This view displays an entry for each possible user that can be configured. This number is platform-specific and is obtained by the SMU from the firmware. For the MAXDATA PLATINUM 9000-4R Server platform, the number of users allowed is 4. This view shows whether a particular user is enabled or disabled for channel access; whether a password is set for the user; and the privilege level the user has for each of the available channels that supports sessions (users can only access channels that support sessions). Sessions allow a framework for user authentication and allow multiple IPMI messaging streams on a single channel.

Note that the first user is always present and is used to support an anonymous login. The username for this user is null (blank) and cannot be changed, so the user name shows the text "Anonymous User." The password is clear (null) by default but can be changed.

It is possible for multiple user entries to have the same username. One case where this might occur is if a different password is desired for the same user on different channels. In this case, the privilege level for the channel that is not to be accessed with the associated password should be set to "No Access". Otherwise, the firmware attempts to use the first entry in the user table that it finds that allows access to the specified channel and would expect the password associated with that entry to be the one entered to gain access to the specified channel.

The settings shown in Figure 41 are explained in more detail in the next section.

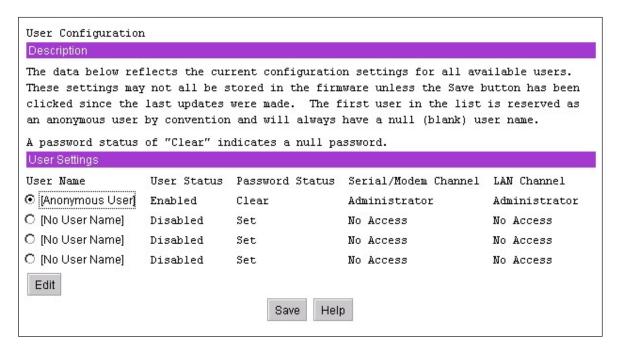


Figure 41. User Configuration Main View

Edit User View

Figure 42 shows the view that is displayed when the Edit button is clicked on the User Configuration main view. Note that any changes made to user settings do not take affect until the next time that user establishes a session.

If the settings for the anonymous user (the first user listed) are chosen to edit, the view displayed is similar to that in Figure 42 except that there is no edit box for the username, since that cannot be changed.

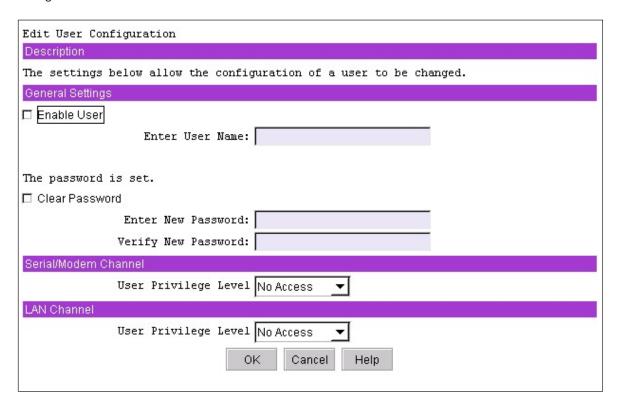


Figure 42. Edit User Configuration View

Enable User

This checkbox is used to enable a user to attempt to have access to the available channels. Leaving the checkbox unchecked disables the user, preventing that user from using the channels.

Enter Username

This edit box is used to enter an out-of-band username. For user #1, the anonymous user, the username cannot be changed (a note on the edit view for user #1 states this also). Usernames can be from 1 to 16 bytes in length, so when entering in ASCII, the password can be from 1 to 16 characters long. The characters accepted by the SMU for usernames are the ASCII printable characters in the range 0x21 through 0x7e, with the exception of left and right bracket characters ('[' and ']'), since those characters are used for framing packets for terminal mode sessions.

Clear Password

This checkbox is used to clear the password for the user specified. If this checkbox is checked, the Enter and Verify New Password edit boxes are grayed out.

Enter/Verify New Password

These text boxes are provided for entering the password for the user being configured. The Verify text box is provided so that you can ensure that the password entered in the Enter New Password field is correct. As a user enters a password, asterisks are displayed. If a password already exists, these fields show "*******". This password can be from 1 to 16 bytes in length, so when entering in ASCII, the password can be from 1 to 16 characters long. The characters accepted by the SMU for user passwords are the ASCII printable characters in the range 0x21 through 0x7e, with the exception of left and right bracket characters ('[' and ']'), since those characters are used for framing packets for terminal mode sessions.

Note that if the Clear Password checkbox is checked, these two edit boxes will be disabled.

If a user password is currently set, the SMU user is not required to enter that current password before changing it. The assumption here is that the SMU user is an administrator that would have rights to change any passwords.

User Privilege Level for LAN Channels

This combo box allows a user to select the privilege level for LAN channel access for the user being configured. Note that the global privilege level set for LAN channel access takes precedence over the user privilege level. So, for example, if the LAN channel is configured for user access only, then users are limited to user operations regardless of the user privilege level.

Note that one option is available that is not described in that section; this is the "No Access" option, which disables a user from establishing a session on the channel. This option is available as a user privilege but not as a channel privilege.

User Privilege Level for Serial/Modem Channel

This combo box allows a user to select the privilege level for serial/modem channel access for the user being configured. Note that the privilege level set for the serial/modem channel takes precedence over the user privilege level. So, for example, if the serial/modem channel is configured for user access only, then users are limited to user operations regardless of the user privilege level.

A description of the possible privilege level choices for serial/modem channel access is given. Note that one option is available that is not described in that section; this is the "No Access" option, which disables a user from establishing a session on the channel. This option is available as a user privilege but not as a channel privilege.

Platform Event Filtering (PEF) Subtask

The Platform Event Filtering (PEF) subtask provides a mechanism for configuring the BMC to take selected actions on event messages that it receives or has internally generated. These actions include operations such as system power-off and system reset as well as triggering the generation of an alert.

PEF Configuration Initial View

After clicking on the PEF subtask, the first view displayed to you is shown in Figure 43.

The BMC maintains an event filter table that is used to select which events trigger an action. Each time the BMC receives an event message (either externally or internally generated) it compares the event data against the entries in the event filter table. The BMC scans all entries in the table and collects a set of actions to be performed as determined by the entries that were matched.

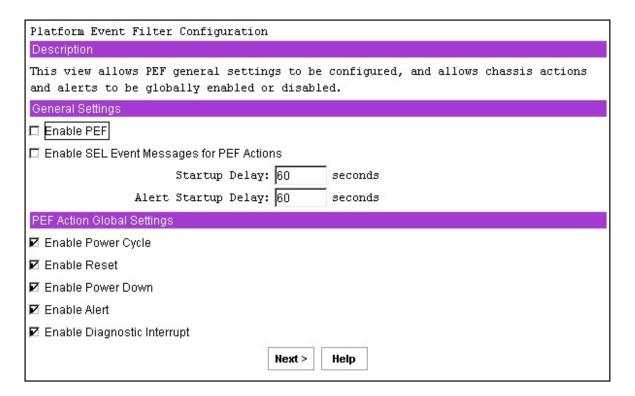


Figure 43. PEF Initial View

Enable PEF

This option is used to globally enable or disable platform event filtering.

Enable SEL Event Messages for PEF Actions

When this option is checked, each action triggered by a filter generates an event message for the action. This allows the occurrence of PEF-triggered events to be logged in the System Event Log (if event logging is enabled).

PEF Startup Delay

This option is used to configure the time in seconds to delay platform event filtering after a system power up or reset. The range is 60 to 255. The default is 60 seconds.

Alert Startup Delay

This setting is used to configure the time in seconds to delay sending out alerts after a system power up or reset. The range is from 0 to 255, where 0 indicates no delay.

PEF Action Global Settings

This set of checkboxes globally enables PEF actions that can occur when an event filter is triggered. Note that for a filter to trigger a particular chassis action (power cycle, reset, power down, or diagnostic interrupt), the global setting in this view must be enabled and that chassis action must be selected for that filter (in the event filter settings view; refer to the next section).

The checkboxes allow enabling or disabling of the following:

Power Cycle

If checked, this checkbox globally enables the Power Cycle action when an event filter is triggered.

Reset

If checked, this checkbox globally enables the system reset action when an event filter is triggered.

Power Down

If checked, this checkbox globally enables the system power down action when an event filter is triggered.

Diagnostic Interrupt

If checked, this checkbox globally enables a diagnostic (non-maskable) interrupt when an event filter is triggered.

Alert

If checked, this checkbox globally enables alerts when an event filter is triggered.

Event Filter Settings View

The PEF event filters settings view, shown in Figure 44, displays to users the supported pre-configured event filters on the platform to which the SMU is communicating, along with settings associated with the event filters. These associated settings are:

- Whether the filter is enabled or disabled.
- The policy number associated with the filter (only required if alerts are enabled).
- A chassis action that occurs if the filter event occurs.
- Whether alerts are enabled or disabled if the filter event occurs.

The settings associated with a particular filter can be edited. Select the radio button next to a filter and then clicking the Edit button. Editing the settings is discussed in more detail in the next section.

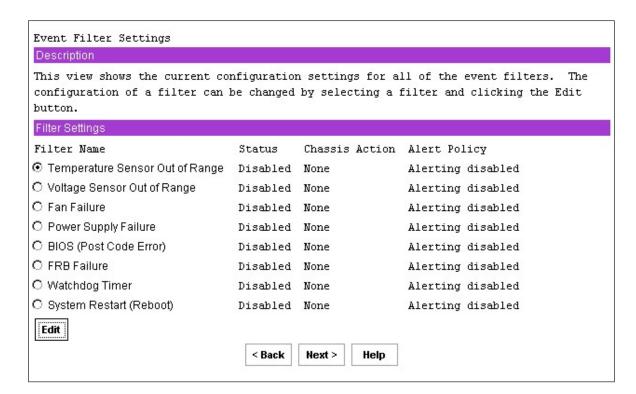


Figure 44. PEF Event Filter Settings View

Edit Event Filter View

The view shown in Figure 45 is the view that is displayed after the Edit button is clicked on the Event Filters Settings view (previous section). The name of the event filter for which settings are being configured is shown after the description of the view.

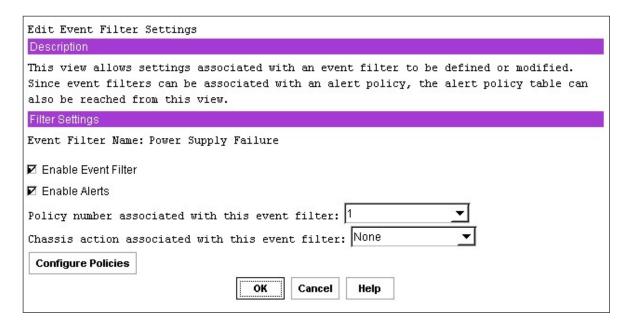


Figure 45. Edit Event Filter Settings View

Enable Event Filter

The Enable Event Filter checkbox should be checked to enable the selected filter or unchecked to disable the filter.

Enable Alerts

This checkbox should be checked to enable an alert to be sent when an event associated with the selected event filter occurs. If it is not checked, or if the global enable for alerts is not enabled, no alert is sent

Policy Number Associated With This Event Filter

This drop-down box allows a user to specify an alert policy number to be associated with the selected event filter. This setting is only enabled if alerts are enabled (via the Enable Alerts checkbox), meaning a valid policy number must be chosen if alerts are enabled. The drop-down list shows the valid policy numbers, which are 1-15 decimal. Policy numbers are assigned to policy table entries by you; refer to the next section for more details.

Chassis Action Associated With This Event Filter

This drop-down box allows a user to select which chassis action (power down, power cycle, reset, diagnostic interrupt, none) is associated with the selected event filter. Note that for any chassis action to occur, it must be globally enabled.

Configure Policies Button

This button provides a shortcut to get to the view that displays the current settings of all entries in the policy table. From that view, a user can edit a policy table entry or configure an unused entry. This button is supplied as a way to define the settings associated with a policy number that can be selected from the drop-down list described in the previous section.

OK Button

Clicking the OK button saves all settings currently shown in this view in the internal copy of the data. The Save button on the last PEF view must be clicked to store these settings into non-volatile storage. You are returned to the Event Filter Settings view after clicking OK.

Cancel Button

Clicking the Cancel button returns you to the Event Filter Settings view without saving any changes made to the selected event filter in the internal copy of the data.

Alert Policy Table View

Figure 46 shows all the entries in the alert policy table, regardless of whether any settings are associated with a particular entry or not. All entries are shown because the entries in the table are order-dependent, so that when an alert occurs, entries in the table are processed from top to bottom as the firmware attempts to match table entries with the policy number associated with the event that caused the alert. By seeing all entries, you are able to ensure that the entries are in the correct order.

One use of the policy table is to be able to specify multiple destinations for alerts that occur. This can be done by assigning the same policy number to multiple entries in the table; but specifying different destinations in the destination field. If one policy is associated with multiple entries in the policy table, users can further refine the destinations that receive alerts by using the policy type.

Note that because the firmware goes through the table in order from top to bottom, when an event occurs, the table is searched in order for entries in which the policy number matches the policy number associated with the event filter. So, the alert is sent to the destinations in the order in which they are encountered in the policy table. You should make sure their destinations appear in the table in the desired order.

The settings shown for each table entry are:

- Alert policy number
- Status indicating whether the table entry is enabled or disabled
- Policy type
- Channel on which the alert corresponding to the table entry would be sent on
- Destination IP address or phone number of the alert
- Alert string associated with the alert

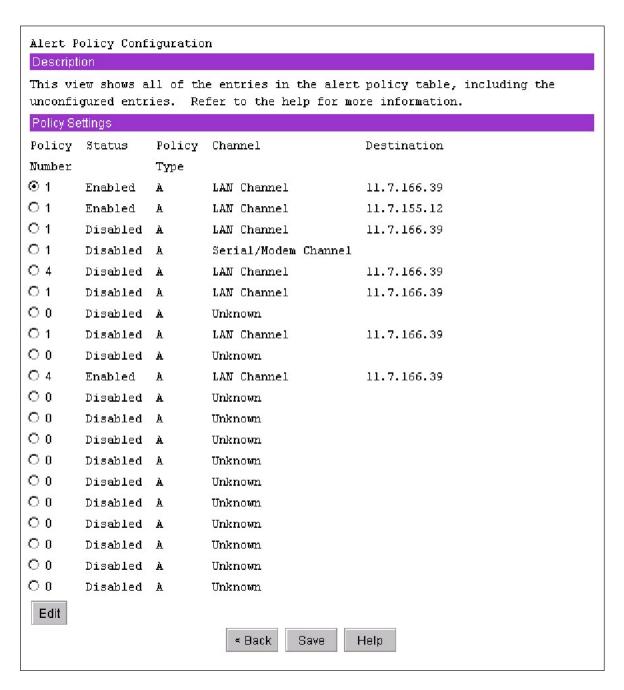


Figure 46. Alert Policy Configuration View

Edit

Selecting an alert policy table entry and then clicking the Edit button displays a view that allows a user to change the settings for that table entry. The settings that can be changed are described in more detail in 123.

Edit Alert Policy Entry View

The view shown in Figure 47 is displayed after clicking the Edit button in the Alert Policy Table view. The data shown is for whatever entry in the policy table was selected when the Edit button was clicked.

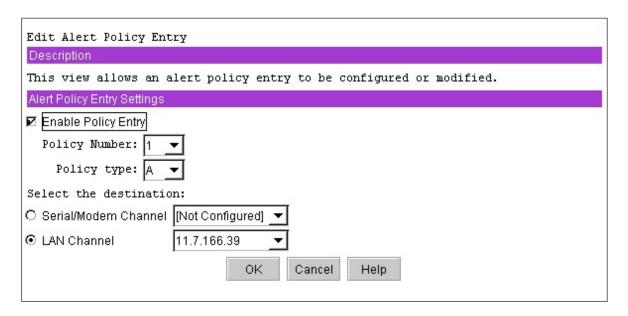


Figure 47. Edit Alert Policy Entry View

Enable Policy Entry

This checkbox should be checked to enable the selected policy table entry. If the entry is to be disabled, the checkbox should not be checked. If disabled, the firmware does not look at that table entry when attempting to match entries to the event that occurred.

Policy Number

This edit box associates a policy number with a policy table entry. If the selected table entry is already associated with a policy number, that policy number is displayed in the edit box. If no policy number is currently associated with the selected table entry, 1 is displayed (the first number in the list of possible policy numbers. Note that if alerts are associated with event filters, a valid policy number is required, so it is not possible to select 0 as a policy number, for example (all policy numbers listed in the drop-down list are valid).

Policy Type

This drop-down box displays a list of letters that represent the choices for policies that can be associated with an alert policy table entry (the assigning of letters to the possible policy choices was done because the amount of text needed to describe each policy was unwieldy for the user interface). The policy type determines how or whether the firmware processes multiple entries in the policy table that have the same policy number (for example, the policy can be used to indicate whether an alert is to be sent to multiple destinations, to destinations involving the same channel, etc.). The policy choices are described in context-sensitive help associated with this view, but are also listed below.

- Policy type A = always send an alert to the destination referenced in this policy table entry.
- Policy type B = if the alert to the previous destination was successful, do not send an alert to the destination referenced in the current policy table entry. Instead, go on to the next entry in the policy table with the same policy number.
- Policy type C = if the alert to the previous destination was successful, do not send an alert to the destination referenced in the current policy table entry, and stop processing policy table entries.
- Policy type D = if the alert to the previous destination was successful, do not send an alert to the destination referenced in the current policy table entry. Instead, proceed to the next policy table entry that has the same policy number but has a destination to a different channel.
- Policy type E = if the alert to the previous destination was successful, do not send an alert to the destination referenced in the current policy table entry. Instead, proceed to the next policy table entry with the same policy number that has a different destination type (a different destination type might be a PPP alert instead of a dial page, for example, although this software does not support PPP alerts).

Select the Destination

This set of radio buttons shows the choice of channel destinations that can be associated with a policy table entry. Each radio button is associated with a drop-down list of destinations that have been configured for that channel (e.g. the serial/modem channel radio button is associated with a drop-down box containing dial strings). Only the selection made in the drop-down list associated with the active radio button (channel) is used if you click the OK button).

OK Button

Clicking the OK button saves all settings currently selected in this view in the internal copy of the data. The Save button on the last PEF view must be clicked to store the settings into non-volatile storage. You are returned to the Alert Policy Table view after clicking OK.

Cancel Button

Clicking the Cancel button returns you to the Alert Policy Table view without saving any changes made to the selected alert policy table entry in the internal copy of the data.

Serial/Modem Channel Configuration Subtask

This section describes the views presented to configure serial/modem channel settings.

Serial/Modem Channel Configuration Initial View

The serial/modem channel configuration subtask allows you to modify settings that relate to the serial/modem channel, set up dial strings to which alerts are sent, and specify the settings related to sending alerts to those destinations. It also contains a view to configure the settings for the terminal mode of operation of the serial/modem channel. The initial view for this channel is shown in Figure 48 and each configuration setting is described following the figure. Note that the view that is displayed when the Next button is clicked depends on which connection mode is chosen: if modem mode is selected, the next view displayed allows setup of modem parameters; if direct connect is selected, since there are no configuration parameters to set, the next view displayed is the Destination Dial Strings view.

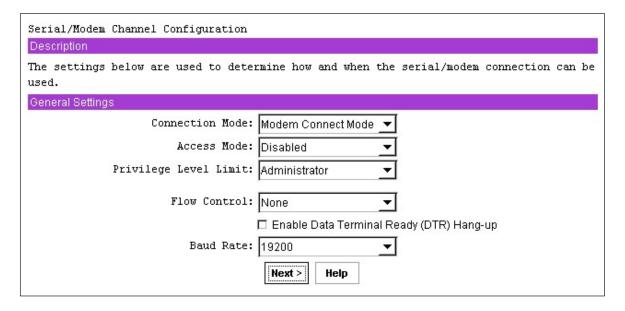


Figure 48. Serial/Modem Channel Configuration Initial View

General Settings

This section describes each of the settings that always apply to the serial/modem channel.

Connection Mode

The connection mode determines the protocols used when performing IPMI messaging to the BMC. After selecting a connection mode, clicking on the "Next" button causes the initial view for the selected mode to be displayed.

Direct Connect Mode

When Direct Connect Mode is selected, the client console and target server are connected by a null modem cable from the serial port of one to the serial port of the other.

Modem Mode

When Modem Mode is selected, the client system is able to establish a connection to the target server using a modem. Each system must have a modem attached, and the user on the client system must have the dial string needed to call the modem connected to the target server.

Access Mode

This option is used to configure the access mode for the Serial/Modem channel. The choices are:

Pre-boot only

The Serial/Modem channel is only available out-of-band while the machine is powered-off and during POST until the boot process is initiated. This option is primarily used with serial port sharing where it may be desirable to ensure that the BMC does not take control of the serial port during OS runtime.

The Pre-boot only setting does not affect Serial/Modem alerting. If alerting is enabled and software does not handle the event, the BMC takes control of the port for the time it takes to deliver the alert.

Always Available

The channel is dedicated to communication with the BMC and is available during all system states (powered-down, powered-up, pre-boot, sleep, run-time, etc.).

Shared

Same as Always Available, but the BIOS typically leaves the serial port available for software use.

Disabled

The channel is disabled from being used to communicate with the BMC (except for alerting).

Privilege Level Limit

The channel privilege limit sets the maximum privilege level that users can have on this channel and it restricts users of the channel to a set of BMC commands that can be issued at that privilege level. For example, if the channel privilege limit is configured with a maximum privilege level of Operator, even if a user is configured to have Administrator privilege, no commands that require Administrator privilege can be executed by that user over this channel.

IPMI Messaging Communication Settings

These parameters are the global settings for IPMI messaging, which include Direct Connect and Modem modes.

Note that IPMI messaging always occurs with 8 bits/character, no parity, and 1 stop bit. The COM settings that can be configured are:

Flow Control

This option sets how the flow of data is controlled. Available choices are No Flow Control, CTS/RTS (hardware handshake), and XON/XOFF.

Baud Rate

This option sets the maximum rate in bits per second at which the data can be transmitted through the serial port. Available baud rates are 9600, 19200, 38400, 57600, and 115200 kbps. Note that support for baud rates higher than 19200 is optional and SMU only displays the ones that the BMC supports.

Enable Data Terminal Ready (DTR) Hang-up

When DTR Hang-up is enabled, hang-up of a modem connection is based on when the DTR signal becomes inactive. Note that when this is enabled, the modem settings Modem Hang-up and Escape Sequences are not used.

Default Serial/Modem Configuration Settings Set By the SMU

The SMU sets some serial/modem configuration settings that are not exposed to the user. The list of these settings is given below. Note that for these settings to be set by the SMU, a user must click the Save button on the last serial/modem configuration view.

Authentication type enables are enabled. These bits define what types of authentication are enabled to authenticate messages sent to the BMC by users of different privilege levels. The SMU enables

authentication of type straight password, MD2, MD5, and none. (Refer to the IPMI specification for more information on these authentication types.)

Basic mode is enabled, allowing basic serial communications to take place over the serial/modem channel.

Session inactivity timeout is set to one minute.

Session termination bits are enabled to enable ending of a serial/modem session if an inactivity timeout occurs or if DCD is lost.

Flow control and baud rate are set for IPMI messaging (flow control is set to hardware flow control; the baud rate is set to 19.2 kbps).

The multiplexor that determines who controls the serial connector has various default settings enabled and disabled.

Modem Mode Configuration View

If Modem Mode is chosen in the serial/modem channel configuration initial view, then when the Next button is clicked, the view shown in Figure 49 is displayed. This mode is for applications that connect to the server via an external modem.

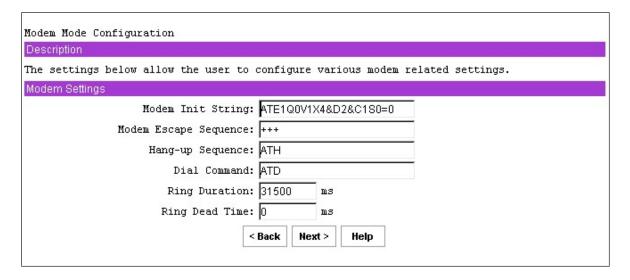


Figure 49. Modem Settings

Modem Init String

This setting is an ASCII string used to initialize the modem. This string is typically set to "ATE1Q0V1X4&D2&C1S0=0" and is 64 bytes maximum, including a termination character. The BMC automatically follows this string with an <Enter> character or carriage return.

Modem Escape Sequence

This setting is an ASCII string representing the Escape string to be sent to the modem before sending a command string. This string is five-bytes maximum in length and it is typically set to "+++". Note that if this parameter is left empty, the default "+++" sequence is used by the BMC. The modem escape sequence is not sent to the modem if DTR Hang-up is enabled;

Hang-up Sequence

This setting is an ASCII string that is sent to the modem to terminate the session. The BMC automatically follows this string with an <Enter> character when sending it to the modem. This string is 8 bytes max and it is typically set to "ATH". Note that if this parameter is left empty, the default "ATH" sequence is used by the BMC. The hang-up sequence is not sent to the modem if DTR Hang-up is enabled;

Dial Command

This setting is an ASCII string for the modem string used to initiate a dial sequence with the modem. If this parameter is left empty, the default "ATD" sequence is used by the BMC.

Ring Duration

The Modem Ring Time setting specifies the time it takes the BMC to claim the serial connection after detecting the phone ringing while monitoring the Ring Indicator (RI) line. By configuring the Ring Duration, a user can specify the amount of time that the BMC takes to switch the mux when RI is first detected.

The ring duration value should be entered in 500 ms increments; if not, SMU rounds this value down to the nearest 500. Also, a "0" value configures the BMC to switch the mux immediately on the first detected transition of RI. The values entered can be in the range from 0-31509, but the values the SMU retains are from 0-31500 rounded down to the nearest 500.

Ring Dead Time

The second configuration setting that deals with Modem Ring Time is Ring Dead Time. This setting allows a user to specify the amount of time that the RI signal must be deasserted before the BMC determines that ringing has stopped.

The ring dead time value should be entered in 500 ms increments; if not, SMU rounds this value down to the nearest 500. The value entered can be in the range 0-7999, but the values that the SMU retains are from 0-7500 rounded down to the nearest 500.

The value entered should also reflect any dependencies on modem type, location of server, and the phone line carrier.

Destination Dial Strings View

The menu shown in Figure 50 displays the current setting of each destination dial string available on the target platform. Since the number of dial strings available is platform-dependent, the number available on the target platform is shown above the list of dial strings. For the MAXDATA PLATINUM 9000-4R Server, the number of destination dial strings is 6. The length of a destination dial string is platform-dependent; for the MAXDATA PLATINUM 9000-4R Server, the number of bytes that can be entered by a user is 31, and a termination character is added onto that.

A dial string can be modified or cleared by selecting the corresponding radio button and then clicking on the Edit button.

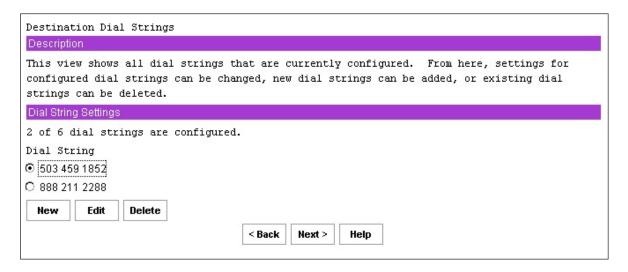


Figure 50. Modem Destination Dial Strings and Settings

When the BMC sends a dial string to a modem, it automatically precedes it with the currently defined Modem Init String sequence.

New/Edit Dial String View

Figure 51 shows a menu in which a user can define or modify a dial string. If a dial string that is non-null is set to null (cleared), then when the OK button is clicked, that entry in the dial string list shows up as "Not Configured." If the Cancel button is clicked, the list of dial strings is shown again unmodified from the last time it was displayed.



Figure 51. New/Edit Dial String View

The valid dialing digits are 0-9, *, #, A, B, C, D. A dial string can also contain any of the following character options:

- P dial using pulse. Dialing digits following the 'P' will be sent using pulse dialing.
- T dial using tone. Dialing digits after the 'T' will be sent using touch tones.
- R reverse frequencies. Forces the modem to dial out at the answering frequency.
- S=n dial a pre-stored phone number n.
- W wait for dial tone.
- @ wait for quiet (answer).
- comma (",) pause 2 seconds.
- semicolon(';') return to command mode after dialing.
- ! flash the switch hook.

Page Destination Configuration View

The menu shown in Figure 52 shows the settings for each page destination that can be reached by sending a page out the serial/modem channel. A page destination is made up of a dial string to be called when a page is to be sent out, retry information for the page, and configuration of the modem at the destination. The number of destinations is platform-dependent; for the MAXDATA PLATINUM 9000-4R Server, the number of page destinations is 8. Note that all page destinations are shown in this view. The Dial String column displays "Not Configured" for any entry that has not been setup by the user.

The set of data shown for each page destination includes the dial string, call retries, flow control, baud rate, parity, data bits, and stop bits for the destination modem. These settings are described in more detail in the next section. This view also displays general settings that apply to all alerts to be sent as dial pages.

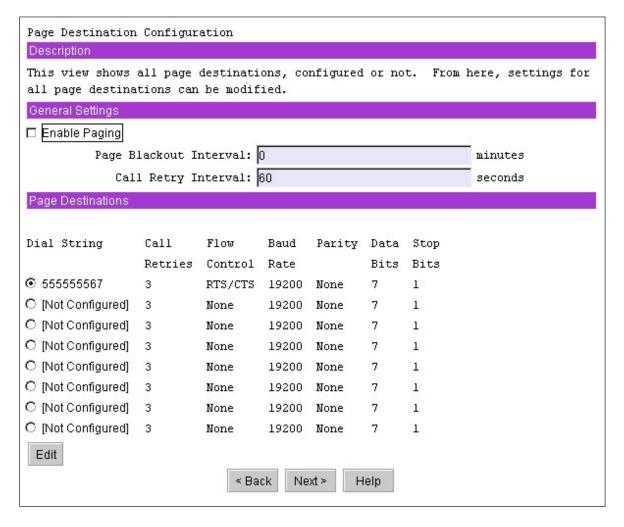


Figure 52. Page Destination Configuration View

To configure or modify the settings for a page destination, you should select a radio button next to the desired entry and then click the Edit button. The view displayed then is described in the next section.

Settings shown on this view that apply to all page destinations are described in the following sections.

Enable Paging

This checkbox enables paging for the serial/modem channel.

Page Blackout Interval

The Page Blackout Intervals determines the minimum number of minutes between successive pages. It provides a mechanism to prevent someone from getting back-to-back pages if a flurry of events occurs. This parameter is entered in minutes and a value of "0" indicates no blackout. The value entered must be in the range 0-255.

Call Retry Interval

This setting gives the number of seconds between call retries when a busy signal is detected. The value entered must be in the range 0-255.

Edit Page Destination View

The menu shown in Figure 53 allows a user to configure or modify the settings for a page destination. Note that not all settings displayed in the page destination view can be changed; the ones that cannot be changed are not shown in the settings view. The settings that cannot be changed are platform-dependent, so the view below would correspond to a particular type of server.

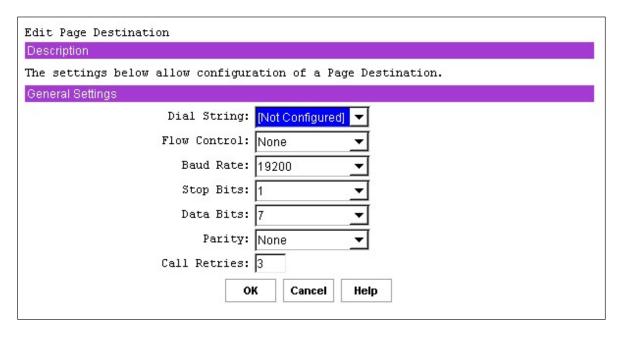


Figure 53. Edit Page Destination Menu

General Settings

These settings are used to configure modem settings for a page destination. Each setting is described below.

Dial String

This drop-down list shows all current list of destination dial strings (including ones not configured). Whatever string is showing in this box when the OK button is clicked is the one associated with this page destination.

Flow Control

This setting sets how the flow of data is controlled. Available choices are No Flow Control, CTS/RTS (hardware handshake), and XON/XOFF.

Baud Rate

This setting determines the maximum rate in bits per second at which the data can be transmitted through the serial port. Available baud rates are 9600, 19200, 38400, 57600, and 115200.

Stop Bits

The number of stop bits to use when transmitting page data. The choices are 1 and 2 stop bits.

Data Bits

The number of data bits to use when transmitting page data. The choices are 7 and 8 data bits.

Parity

Shows the parity type that is used when transmitting the page data. The choices are None, Odd, and Even.

Call Retries

This setting is the number of times to retry calling the destination specified by the destination dial string (if the call does not connect to the destination). A value of zero indicates no retries (the call is only made once). The value entered must be in the range 0-7.

Terminal Mode Configuration View

The menu shown in Figure 54 allows a user to configure the settings used when terminal mode is active. Terminal mode is an operating mode of the BMC such that the BMC can accept and respond to commands via printable characters over a serial/modem channel. This includes a set of text commands that the BMC understands as well as IPMI commands in hex format. More about terminal mode can be found in the IPMI v1.5 Specification.

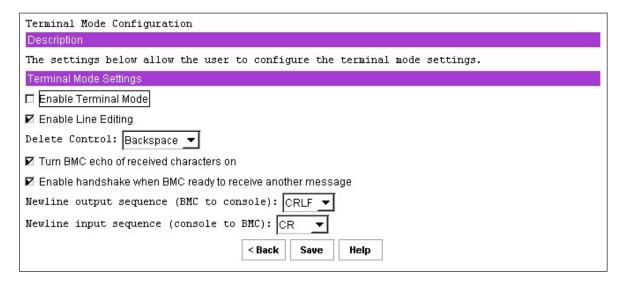


Figure 54. Terminal Mode Configuration Menu

Terminal Mode Settings

This section describes the general settings that are exposed for configuration for terminal mode.

Enable/Disable Terminal Mode

This setting enables or disables terminal mode.

Enable/Disable Line Editing

This setting enables or disables line editing during a terminal mode session if checked. When line editing is enabled:

- 1. The <Backspace> or <Delete> key can be used to delete the last character entered.
- 2. The <ESC> key can be used to delete an entire line.
- 3. Long message lines can be split across multiple-lines using a line continuation ("\") character followed immediately by a <CR><LF>.

Delete Control

This setting is enabled only if line editing is enabled. Users can choose between having the BMC output a <Delete> character when <Backspace> or <Delete> is received, or have the BMC output a <Backspace> <Space> <Backspace> sequence when <Backspace> or <Delete> is received.

Turn BMC Echo of Received Characters On

This setting allows a user to enable the BMC echoing characters it receives when in terminal mode. Checking the checkbox enables this feature.

Enable Handshake When BMC Ready To Receive Another Message

This setting enables or disables whether the BMC handshakes when ready to receive another message from you. Checking the checkbox enables this feature.

Newline Output Sequence

This setting allows you to select which characters the BMC uses as a <newline> sequence when the BMC writes a line to the console when in terminal mode. The choices are <CR><LF>; <NULL>; <CR>; <LF><CR>; <LF> only; and no termination sequence.

Newline Input Sequence

This setting allows you to select the characters the console uses as a <newline> sequence when writing to the BMC when the BMC is in terminal mode. The choices are <CR> or <NULL>.

Power Configuration Subtask

This section describes the view presented to configure the power restore policy.

Power Configuration View

This view allows a user to configure the power restore policy for the server. The power restore policy determines what action the chassis or system takes when power is removed and then reapplied. This view is shown below.

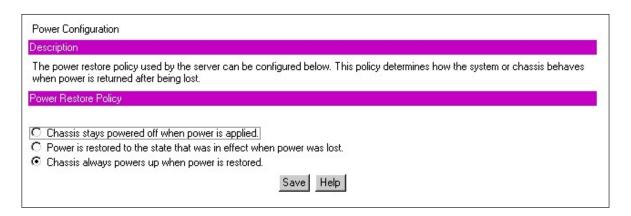


Figure 55. Power Configuration Settings View

The power restore policy has three possible settings:

- Chassis stays powered off when power is applied. When power is reapplied to the server, the server will not power up.
- Power is restored to the state that was in effect when power was lost. If the system power
 was on when power was lost, the server will power back on. If the server was powered down,
 it will remain powered down when power is reapplied.
- Chassis always powers up when power is restored. When power is reapplied, the server will power up.

The radio button that is shown selected is the current setting. However, it is possible for a policy value to be read from the firmware that does not correspond to any of these three settings (this value is classified as "unknown"). In this case, the user is informed via a dialog box that such a state was read. A setting of "Power is restored to the state that was in effect when power was lost" is suggested and the corresponding radio button is shown as selected, but that selection can be changed by the user after dismissing the dialog box.

Save Operation Success/Failure View

Any time a save operation is selected when using the server management configuration task, a view is displayed indicating the success or failure of the save (see Figure 56). A successful save produces a view similar to the one shown below (the header and the text below it both reflect which settings were just saved).



Figure 56. Save Operation Successful View

When the OK button is clicked on a view like the above, the SMU home view is displayed in the primary information pane.

Task Error Handling

During execution of a task, it is possible for errors to occur. These errors may be handled in different ways depending on the type of error. This chapter describes how error handling operates during SMU task execution.

Data Entry Errors

Some views will ask for user input using edit boxes. In some of these boxes, the allowable user input needs to meet certain requirements, such as use of certain characters, a maximum length, or data within a particular range of values. Currently, the application side does not check user input for validity; instead, when you click a button for the next view, the current set of data is collected and sent to the SMU core components where it is checked. If a data entry error is found, a popup dialog box is displayed describing the error. An example of this type of dialog box is shown in Figure 57.



Figure 57. SMU Invalid Data Entry Error Example

Clicking the OK button causes the dialog box to go away, and then the same view is redisplayed to give you another chance to enter valid data. Note that in most cases the erroneous data is not cleared from the edit box in which it was entered.

Internal Errors For Which a View Can Be Generated

Some errors may occur during task execution that result in an operation failing but are not fatal in that you can still attempt to perform other tasks. These types of errors include writing the server management settings to the BMC's non-volatile storage area, for example. In such a case, a view is displayed containing information about the error that occurred and indicating whether or not you may attempt the operation again. These views also have an "OK" button on them. When you click "OK", the last view displayed is redisplayed. You may also be informed as to whether the error was serious enough that you should shut down the SMU software or reboot the server.

Data Corruption Errors That the SMU Application Can Handle

Data corruption errors that the SMU may be able to handle include corruption of template files used by the SMU (files that represent UI views to be sent from the core components to the application). In this type of case, the SMU can detect that there is a problem when it is not able to correctly parse such a file, which means the application is not able to correctly display a view. For this type of error, a message is displayed indicating that a data corruption error has been encountered and that the current action cannot be completed. You are asked to select a new task from the task list.

Internal Errors For Which a View Cannot Be Generated

In a few cases, errors may be serious enough to prevent the SMU core components from supplying error information to you. These errors may include certain types of memory allocation errors or, in the remote case, the loss of the connection between the SMU application and the core components. In such cases, the SMU application (if possible), indicates to you that a shutdown of the software should occur and the server be rebooted.

Help

Help for the Remote SMU Application

Help for the remote SMU application is HTML-based to match the format used by other ISM products. This means SMU help is displayed in a separate instance of a browser. An example of the help display is shown in Figure 58.

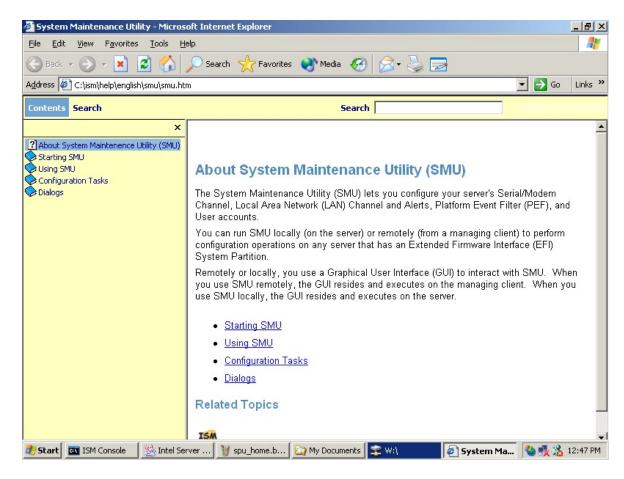


Figure 58. Remote SMU Help Window (Browser-based)

Help for the SMU exists in two help subsystems, the front-end ISM help and the context-sensitive SMU help.

Remote SMU Help Use Cases

This section describes the various ways help related to the SMU can be obtained when running remotely.

ISM Front-end Help

The front-end ISM help subsystem contains some general information on the SMU. This help is fairly generic and is not context-sensitive (does not give details related to the views displayed by the SMU). This help can be accessed by clicking on the Contents task in the task pane of the ISM Console.

SMU Table of Contents Help

After the SMU is launched, its task pane also shows a Help item (non-selectable) with a Contents subtask under it. If Contents is clicked, a new browser window is launched that has the format shown in Figure 59. The table of contents pane on the left allows you to view context-sensitive help for any view displayed by the SMU. Each page displayed in the information pane (on the right) contains links labeled "About SMU" and "ISM x.x Help" (where x.x is the revision number of the ISM release). Clicking on About SMU returns you to a general front page for the SMU (is not context-specific). Clicking on ISM x.x Help launches a new browser that contains the front-end ISM help.

Help Buttons

Most views displayed by the SMU have a Help button on them. If no help is currently displayed, clicking a Help button launches a browser window that shows only the context-sensitive help for the view containing the Help button; there will not be a table of contents pane. Since each view has the "About SMU" and "ISM x.x Help" links, if the About SMU link is clicked, the help window is repainted with a table of contents pane and the "About SMU" information in the information pane. If the ISM x.x Help link is clicked, a separate browser window is launched and the front-end ISM help is displayed in that window.

If a help browser window was previously launched from the Contents task of the SMU application, then when a Help button on an SMU view is clicked, the information pane of that window is replaced with the context-sensitive help for the view containing the Help button.

Help for the Local SMU Application

Help for the local SMU application appears in a modeless window on the client console since there is no browser available as when running remotely. This means that when you want to return to the local SMU application, it is necessary to click on some part of the application window. The F1 key can also be used to toggle between the SMU application window and the help window. Note that since the application takes up the entire screen and its container is not re-sizeable, the help window is hidden when the application window is brought to the forefront. The help window is re-sizeable and can be moved. An example of the local help window is shown below.

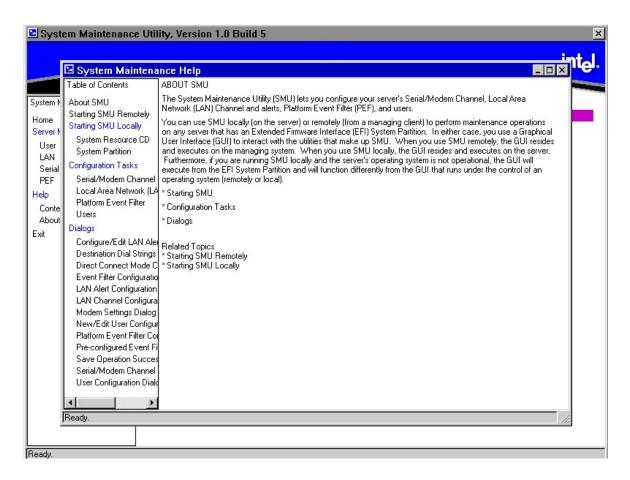


Figure 59. SMU Local Help Window

The Help window also has a system menu (available from the upper-left hand corner) that allows the Help window to be minimized or maximized. In the upper right-hand corner of the Help window are minimize, maximize and close buttons. The task pane of the Help window can be resized to support horizontal and vertical scroll bars. However, the task pane cannot be sized larger than half the size of the containing window.

Note that the information shown in the help window is obtained by running the HTML version of the help through a translator. Thus, the content should be effectively the same. However, the appearance is much different, since the local SMU application is not as flexible as a browser.

Most individual views displayed in the primary information pane will also have help buttons. Clicking on a help button causes the help related to that view to be displayed in the help window, and cause the help window to appear in the foreground.

If the Help window is minimized it can only be brought back up by pressing the F1 key or clicking a Help button in a view. If the Help window is not active and the F1 key is pressed, the "About SMU" help page is displayed in the information pane. In general, all keys described in the section on local SMU keyboard support work for the help window as well as the local SMU application container.

Shutting Down the Server

To shut down the server you must exit the operating system (if applicable) and then use the power button to power down the server.

Follow these steps to power down the MAXDATA PLATINUM 9000-4R Server.

- 1. If the server is running an operating system, use its commands or GUI to logoff (if necessary) and exit the operating system. If the operating system does not automatically power down the server, then successfully exiting the operating system causes the following prompt to appear:
- 2. After this prompt appears, press and hold the power button for several seconds. Holding the power button in powers down the server.



/!\ CAUTION

Powering down the server with the power button does not remove all power from the system. The +12 V standby power is still available to the system even when it has been powered down. To remove standby power from the system you must unplug both power cords from the chassis.

EFI Platform Diagnostic Tests

EFI Platform Diagnostic Tests allow you to guickly assess the server's hardware status, view test logs, and determine the server's current configuration. You can run EFI Platform Diagnostic Tests from within the EFI environment. The remainder of this section explains how to run the EFI Platform Diagnostic Tests.

Starting the Application

Use the following steps to setup and run tests.

NOTE

You may also run this utility directly from the Resource CD. This causes the utility to run in a RAM drive which means log files are volatile and will need to be copied to write-able media if they need to be saved.

- 1. Boot to the EFI shell.
- 2. Create a directory "efi\service\diagnostics" on the target drive such as a hard drive.
- 3. Copy the distributed FieldDiags binary file (fielddiags.efi) to the root directory of the target.
- 4. Run the following command using the distributed FieldDiags binary file (fielddiags.efi) fielddiags -d \efi\service\diagnostics (it unpacks and installs the FieldDiags software).
- 5. Be sure your working directory is on the same drive that contains the test software, type in the following command and press the <Enter> key to load and run the tests:

\efi\service\diagnostics\fielddiags

Entering this command causes the tests to run regardless of your current working directory. You can also type a relative pathname that is based on your current working directory to execute the tests.

In addition to running tests, you can display system configuration information or the current test log. To do either, highlight the appropriate option and then press the <Enter> key.

Understanding the General User Interface

The platform diagnostics application uses multiple screens from which you can choose execution options, enable or disable tests for execution, and define test parameters. The initial screen consists of four pull down menus:

- File
- System Information
- Platform Test
- Help

Up and down arrows navigate vertically through all areas of the screen. During navigation, items that you can modify become highlighted. Left and right arrow keys navigate horizontally through the menus.

- Pressing the <Enter> key with an execution option highlighted causes the action to occur.
- Pressing the <Enter> key from within a dialog box causes data to be entered.
- Pressing the <F1> key while a test is highlighted or has the greater-than character (>) to the left of it causes on-line help for that test to appear.
- Pressing the <ESC> key with on-line help displayed or with a dialog box displayed dismisses the information or dialog box.

Understanding Basic Testing

The Platform Test menu is set up in the order that is typically used:

- Test Setup allows you to determine which tests to run and how thoroughly to test.
- Run Test starts test execution and provides some indication of test progress.
- View Results shows the results window and allows you to view and clear the test log.

Enabling Tests For Execution

To enable one or more tests for execution, select Test setup from the Platform test menu. Use the up and down arrows to first select a test, and then press <Q> for a quick test, <C> for a complete test, or <D> to disable the test. When a test is enabled, the word "Quick" or "Complete" appears next to the test under the "Coverage" column. If a test is disabled, the word "Disabled" appears under that column. An individual test may be executed up to nine times for each run of the test suite. With the test highlighted, pressing a single digit 1 – 9 on the keyboard sets the number of iterations for an individual test.

Because of space limitations, the test area of the screen displays only six tests at a time. Using the arrow keys causes the test display to scroll completely through the list.

■ NOTE

By default on startup all tests are set to "Quick" test and single iteration. You may go directly to "Run Test" if no changes are required.

Setting Test Options

The Test options pull down opens the Test Options window. In the Test Options window you may determine if the test stops on one of two parameters; time or iterations. By navigating to the "Stop On" item in the window and hitting the <Enter> key you are given the options of "Iterations" or "Minutes". If Iterations is set, the testing stops after executing the full test suite, however many times is indicated by the number in the "Iterations" edit box. If minutes is selected, the test suite repeats until the number of minutes in the Minutes edit box have passed, and then stop after executing the final test of that suite.

Interpreting Results

Test results appear next to the enabled tests in the test area of the screen. Each time a test passes or fails during a loop, the appropriate pass or fail count increments. For failed tests, Field Replaceable Unit (FRU) information also appears under the "Details" column.

If you want greater detail for the test run, view the test log file. For information on how to view the test log file, refer to Section "Viewing the Test Log" below.

Getting Help On Individual Tests

To display on-line help text files for a particular test, use the arrow keys to highlight the desired test and then press the <F1> key. The application presents a scrollable text file that describes the subtests for the highlighted test.

Viewing System Information

To view system information, use the arrow keys to highlight the appropriate menu item, and press the <Enter> key. From the menu select the system information to be viewed.

After pressing the <Enter> key, the application displays a scrollable information box that contains system information.

Viewing the Test Log

By default, the diagnostic software keeps the log file in "efi\service\diagnostics" in a file named "fielddiags.log."

To view this file, use the arrow keys to highlight the PlatformTest menu and select View Results from that menu, by pressing the <Enter> key. After pressing the <Enter> key, the application displays a scrollable information box that contains the sessions test log. Because the log file is a Unicode file, you can also view it in the EFI shell by using the "type-u" command, and in the Microsoft® Windows® operating system using the Notepad application.

All test results are appended to the previous log file. To clear the log file select the Clear log button on the View Results window. Note: because the log file is now always appended, it is recommended that the file be cleared a regular basis to keep the file size from getting too large.

EFI Service Partition

The EFI Service Partition provides the ability to remotely access an server running EFI, via modem or LAN, for the purpose of executing configuration/setup utilities, remote diagnostics, and any other software designed to be compatible with this environment.

Service Partition Requirements

- 1. The SP may reside on any of the EFI-recognized physical drives. Drives not supported by EFI cannot be used for a service partition or EFI System Partition.
- 2. An EFI System Partition cannot be installed on legacy MBR disks. The disk must be formatted as a GPT disk. (GUID Partition Table). This utility will not reinitialize a legacy MBR disk.
- 3. The SP requires at least 65 MB free on the chosen EFI System Partition.
- 4. For proper operation, there must be only one set of service partition files present.

Installing Service Partition Files

The service partition on an Intel® Itanium® 2-based platform is part of the Extensible Firmware Interface (EFI) System Partition. This partition is not a separate, dedicated partition as is its functional counterpart on an IA-32 platform. The presence of "service partition" files within the existing system partition defines the EFI Service Partition.

The service partition is established when the installation program copies service partition files into the existing system partition. These files comprise utilities, diagnostics, and other software required for remote management. You can run the utilities and diagnostics located on the service partition either locally or remotely. In order to run the utilities and diagnostics you must boot the server from the partition. Applications that execute in the service partition run only on the managed server.

Installation Requirements

Be sure you adhere to the following requirements when installing the service partition files:

- The current ECO BIOS and FW are installed.
- You must use the installation software on the current System Resource CD to install the system partition files, thus defining the service partition.
- At least 125 MB or one percent of the selected drive must be available (as un-partitioned space).

Installing the Files

Follow these steps to install the service partition files onto a managed server whose operating system is already installed:

■ NOTE

You can also install the service partition directly from the Resource CD. For information. Insert the System Resource CD into the managed server's CD-ROM drive before booting to EFI Shell. Boot the system into EFI Shell, the EFI CD Menu program launches automatically. If the EFI CD Menu program does not launch in the EFI Shell, mount and map to the CD drive and type 'startup' and press <Enter> to launch the EFI CD Menu.

- 1. From the menu tab, use the arrow keys to navigate over to the Utility menu and hit <Enter> or the down arrow to expand the menu.
- 2. From the Utility menu, arrow down to "Install Service Partition" and hit <Enter> to launch the Service Partition Administration menu.

- 3. Choose 3 and press < Enter> to install the service partition files.
- 4. The installation software reports whether a system partition has been found. If so, it is recommended that you choose to install the service partition files onto the existing system partition. Do so by choosing 1 and pressing <Enter>.
- 5. Choose the number for the system partition on which to install the partition files and press <Enter>.
- 6. After receiving the message indicating that all files were installed successfully, press any key.
- 7. Press <ESC> to exit the Service Partition Administration menu and return to the EFI CD menu.

Booting the Server from the Service Partition

The service partition contains utilities and diagnostics. To run these utilities or diagnostics, you need to boot the server from the service partition. You can reboot a managed server from the service partition one of two ways: locally, or remotely. When you reboot the server to the service partition remotely, you can do the following:

- Run EFI shell commands on the server
- Run a program from the service partition
- Run diagnostics specific to the server
- Run the SMU to configure the server for Server Management

Locally

Follow these steps to locally boot the server to the service partition:

- 1. Restart the managed server.
- 2. Monitor the boot process and press 'F2' to enter BIOS setup. Arrow over to the "System Management" menu, and select "Enabled" for the "Service Boot" option. Hit the <F10> to save the setting and exit out of the BIOS setup and the system automatically reboots to the Service Partition.

Console Redirection

The BIOS supports redirection of both video and keyboard via serial link. This section details the serial redirection scheme. For redirection over LAN (Serial over LAN or SOL), please refer to the ISM Users Guide.

When console redirection is enabled, local (host server) keyboard input and video output are passed both to the local keyboard and video connections, and to the remote console via the serial link. Keyboard inputs from both sources are considered valid and video is displayed to both outputs. Optionally, the system can be operated without a host keyboard or monitor attached to the system and run entirely via the remote console. Setup and any other text-based utilities can be accessed via console redirection. Note that serial redirection uses PC-ANSI and the UART settings assume 1 stop bit.

Operation

When redirecting through a modem (as opposed to a null modem cable), the modem needs to be configured with the following:

- Auto-answer (for example, ATS0=2, to answer after two rings).
- Modem reaction to DTR set to return to command state (e.g., AT&D1).

Failure to provide item #2 results in the modem either dropping the link when the server reboots (as in AT&D0) or becoming unresponsive to server baud rate changes (as in AT&D2).

The Setup/EMP option for handshaking must be set to CTS/RTS + CD for optimum performance. The CD refers to carrier detect. If EMP is sharing the COM port with serial redirection, the handshaking must be set to CTS/RTS+ CD. In selecting this form of handshaking, the server is prevented from sending video updates to a modem that is not connected to a remote modem. If this is not selected, video update data being sent to the modem inhibits many modems from answering an incoming call. An EMP option utilizing CD should not be used if a modem is not used and the CD is not connected.

Once console redirection is selected via Setup, redirection binary is loaded into memory and activated during POST. While redirection cannot be "removed" without rebooting, it can be inhibited and restarted. When inhibited, the serial port is released by redirection and might be used by another application. Restarting reclaims the serial port and continues redirection. Inhibiting/restarting is accomplished through the following INT 16h mechanism. The standard INT 16h (keyboard handler) function ah=05h places a keystroke in the key buffer, just as if an actual key had been pressed. Keystrokes so buffered are examined by redirection, and if a valid command string has been sent, it is executed. The following commands are supported in this fashion:

- Esc-CDZ0 Inhibit Console Redirection
- Esc-CDZ1 Restart Console Redirection

In order to inhibit redirection, the software must call INT 16h, function ah=05h five times to place the five keys in the key buffer. Keystrokes sent to the INT 16h buffers for purposes of invoking a command are buffered, and should be removed via the normal INT 16h calls to prevent these keystrokes from being passed on to another application.

Keystroke Mappings

During console redirection, the remote terminal (which may be a dumb terminal or a system with a modem running a communication program) sends keystrokes to the local server. The local server passes video back over this same link.

For keys that have an ASCII mapping, such as A and Ctrl-A, the remote simply sends the ASCII character. For keys that do not have an ASCII mapping, such as F1 and Alt-A, the remote must send a string of characters, as defined in the tables below. The strings are based on the ANSI terminal standard. Since the ANSI terminal standard does not define all the keys on the standard 101 key U.S. keyboard, mappings for these keys were created, such as F5 - F12, Page Up, and Page Down.

Alt key combinations are created by sending the combination ^[} followed by the character to be Alt modified. Once this Alt key combination is sent (^[}), the next keystroke sent is translated into its Alt-key mapping (that is, if ^[} is mapped to Shift-F1, then pressing Shift-F1 followed by 'a' would send an Alt-a to the server).

The remote terminal can force a refresh of its video by sending ^[{.

Presently, unusual combinations outside of the ANSI mapping and not in the table below, are not supported (for example: Ctrl-F1).

Table 21. Non-ASCII Key Mappings

Key	Normal	Shift	Ctrl	Alt
ESC	^[NS	NS	NS
F1	^[OP	NS	NS	NS
F2	^[00	NS	NS	NS
F3	^[OR	NS	NS	NS
F4	^[OS	NS	NS	NS
F5	^[OT	NS	NS	NS
F6	^[OU	NS	NS	NS
F7	^[OV	NS	NS	NS
F8	^[OW	NS	NS	NS
F9	^[OX	NS	NS	NS
F10	^[OY	NS	NS	NS
F11	^[OZ	NS	NS	NS
F12	^[O1	NS	NS	NS
Print Screen	NS	NS	NS	NS
Scroll Lock	NS	NS	NS	NS
Pause	NS	NS	NS	NS
Insert	^[[L	NS	NS	NS
Delete	(7Fh)	NS	NS	NS
Home	^[[H	NS	NS	NS
End	^[[K	NS	NS	NS
Pg Up	^[[M	NS	NS	NS
Pg Down	^[[2J	NS	NS	NS
Up Arrow	^[[A	NS	NS	NS
Down Arrow	^[[B	NS	NS	NS
Right Arrow	^[[C	NS	NS	NS
Left Arrow	^[[D	NS	NS	NS
Tab	(09h)	NS	NS	NS

NS = Not supported, (xxh) = ASCII character xx

Table 22. ASCII Key Mappings

Key	Normal	Shift	Ctrl	Alt
Backspace	(08h)	(08h)	(7Fh)	^[}(08h)
(accent)`	`	(tilde) ~	NS	^[} `
1	1	!	NS	^[}1
2	2	@	NS	^[}2
3	3	#	NS	v[}3
4	4	\$	NS	^[}4
5	5	%	NS	^[}5
6	6	۸	NS	^[}6
7	7	&	NS	^[}7
8	8	*	NS	^[}8
9	9	(NS	^[}9
0	0)	NS	^[}0
(dash) -	-	(under) _	(1Fh)	^[}-
=	=	+	NS	^[}=
a to z	a to z	A to Z	(01h) to (1Ah)	^[}a to ^[}z
[[{	(1Bh)	^[}[
]]	}	(1Dh)	^[}]
\	\	1	(1Ch)	^[}\
(semi-colon);	;	(colon):	NS	^[};
(apostrophe) ,	1	(quote) "	NS	^[} ,
(comma) ,	,	<	NS	^[},
(period) .		>	NS	^[}.
/	1	?	NS	^[}/
(space)	(20h)	(20h)	(20h)	^[}(20h)

NS = not supported, (xxh) = ASCII character xx

Limitations

Console redirection is a real mode BIOS extension, and has been modified to transition into EFI space. The transition is actually a parameter passing exercise whereby the serial redirection scheme native to the EFI takes over using the settings established in BIOS Setup.

Video is redirected by scanning for, and sending changes to, text video memory across the redirection channel. Thus, console redirection is unable to redirect video in graphics mode. Keyboard redirection functions via the BIOS INT 16h handler. Software bypassing this handler does not receive redirected keystrokes. After entering EFI, the redirection scheme changes somewhat, but the effect is the same.

Interface to Server Management

If BIOS determines that console redirection is enabled, reads the current baud rate from EMP, and passes this value to the appropriate management controller via the IPMB.

Sample Setup for Console Redirection

This is an example of how to configure the console/host and server for console redirection. In this example, the console is running under Microsoft® Windows® XP with SP2. The console and server is directly connected through the serial ports of both systems using a serial null modem cable:

Server Configuration

- 1. Power on the server and when prompted, press the <F2> key to enter BIOS Setup.
- 2. The BIOS Setup menu displays the Main menu. Use the arrow keys move over to the "System Management" menu.
- 3. At "System Management" menu, arrow down to the "Console Redirection" submenu and press the <Enter> key to enter this menu.
- 4. Arrow to the "Serial Console Redirection" option and press <Enter>.
- 5. Chose "Enabled" by using the arrow key and press <Enter>.
- 6. The "Serial Port" menu should already have COM2 as the choice, if not, choose the "Serial Port" option and change it by using the arrow and <Enter> as described in steps 4 and 5 for the "Serial Console Redirection" menu.
- 7. Set the "Baud Rate" to 115.2K.
- 8. Set the "Flow Control" to CTS/RTS.
- 9. Set the "Terminal Type" to VT-UTF8.
- 10. Press the <F10> key to save the configuration changes and exit BIOS Setup.
- 11. At the prompt to save changes and exit, select "Yes" and pressing the <Enter> key.
- 12. This reboots the server with console redirection enabled. At this point, power down the server and configure the console.

Console Configuration

- 1. Boot the console into the OS.
- 2. Launch Hyperterminal by clicking on the "Start" button in the task bar.
- Select "Programs>Accessories>Communications" and click on Hyperterminal.
- 4. At the Connection Description window, enter "guest" for the name and click "OK" to proceed.
- 5. At the Connect To window, select the COM port of the console that the Null modem is connected. In this example, it is COM1.
- 6. At the COM1 Properties window, select "115200" for the Bits per second (Baud rate) box to match what was configured via the SMU on the server.
- 7. Select "Hardware" for the Flow Control to match what was configured in the BIOS Setup (CTS/RTS is the Hardware flow control).
- 8. Leave the default settings for the other boxes. Click "OK" to accept the settings and enter the Hyperterminal screen.
- 9. At this point, power on the server. The console starts displaying the redirection once the video synchronizes on the server.

Terminal Mode Overview

Terminal mode is a feature that allows you to directly interface to the server's Baseboard Management Controller (BMC) via a serial port connection and execute text-based commands. Two types of text commands are supported:

- A limited selection of text commands
- Standard binary IPMI 1.5 hex-ASCII commands

Using the terminal mode feature you can do the following:

- Power the server on or off
- Reset the server
- Retrieve the server's health status
- Configure and retrieve the server management subsystems boot options
- Configure and retrieve the BMC's terminal mode configuration
- Execute any platform supported binary command specified in the Intelligent Platform Management Interface (IPMI) v1.5 specification using the hex-ASCII format

Setup and Configuration

Connection Mechanism

Two types of connection mechanisms are supported as follows:

- Direct connection, where a local host is connected to the target system "directly," or from one system's serial port to another, and;
- Modem connection, where the local host is connected to the target system via a modem.

Hardware Setup

Hardware setup is dependent upon the type of connection mechanism being employed as follows:

- For a direct connection, a null modem cable is all that is needed to connect the local host to the target system
- For a modem connection, the local host and target systems must both be connected to modems via serial cables

Configuration Using System Maintenance Utility (SMU)

Configuration of terminal mode requires proper configuration of the following: the serial channel, user login information (user name and password), and the terminal mode configuration parameters. SMU provides methods to access and manipulate all the necessary parameters for terminal mode configuration.

Serial Channel Configuration

The serial channel configuration setup is done with the SMU.

Set the connection mode to the desired connection mode and the rest of the options to the desired state for your application.

Direct Connection Mode

Set the options on the direct connection mode to the desired states for your application. It is highly recommended that you disable the ping message or else you will get serial ping message data from the BMC displayed on your terminal screen.

Modem Connection Mode

Set the options on the modem connection mode to the desired states for your application. It is highly recommended that you disable the ping message or else you will get serial ping message data from the BMC displayed on your terminal screen.

Be sure to save the new serial channel configuration when you are done editing the serial channel settings

Sample Setup for Terminal Mode

This is an example of how to configure the console/host and server for Terminal Mode. In this example, the console is running under Microsoft® Windows® 2000 with SP2. The console and server is directly connected through the serial ports of both systems using a serial null modem cable:

Server Configuration:

- 1. Run the SMU to configure the BMC.
- 2. In the Navigation Pane of the SMU (located on the left side), click on the Serial/Modem option. This takes you to the Serial/Modem configuration menu.
- 3. At the Connection Mode box, pull down the menu and select "Direct Connect Mode."
- 4. Select "Always Available" for the Access Mode.
- 5. Select "Administrator" for the Privilege Level Limit.
- 6. Select "None" for Flow Control.
- 7. Leave the Enable Data Terminal Ready box unselected.
- 8. Select "19200" for the Baud Rate.
- 9. Click on the "Next" button to move to the next menu.
- 10. Click "Next" again to get to the Terminal Mode Configuration screen.
- 11. "Check" the Enable Terminal Mode box.
- 12. "Check" the Enable Line Editing box.
- 13. Select "Backspace" for the Delete Control.
- 14. "Check" the Turn BMC echo of received characters on box.
- 15. "Check" the Enable handshake when BMC ready to receive another message box.
- 16. Select the "CRLF" for the Newline output sequence (BMC to console) box.
- 17. Select the "CR" for the Newline input sequence (console to BMC) box.
- 18. Click "Save" to save your settings and "Ok" to return to the Home page of the SMU.
- 19. Click on the "User" option in the Navigation Pane to configure the user setup.
- 20. Select the "Anonymous User" box and click on the "Edit" button to configure this User.
- 21. In the Edit User Configuration screen, "check" the Enable User box.
- 22. In the Enter New Password box, enter your password. In this example the password is guest.
- 23. Enter the password again in the Verify New Password box.
- 24. Select "Administrator" for the User Privilege Level under the Serial/Modem Channel menu.
- 25. Click "OK" to exit out of this menu. Click "Save" to save the configuration.
- 26. Click "OK" at the User Save Result menu to return to the Home menu.
- 27. At the Home menu, click on the "Exit" option in the Navigation pane to exit SMU, click "OK" to confirm the exit.
- 28. Reboot the server.

Console Configuration:

- 1. Boot the console into the OS.
- 2. Launch Hyperterminal by clicking on the "Start" button in the task bar.
- 3. Select "Programs>Accessories>Communications" and click on Hyperterminal.
- 4. At the Connection Description window, enter "guest" for the name and click "OK" to proceed.
- 5. At the Connect To window, select the COM port of the console that the Null modem is connected. In this example, it is COM1.
- 6. At the COM1 Properties window, select "19200" for the Bits per second (Baud rate) box to match what was configured via the SMU on the server.
- 7. Select "None" for the Flow Control to match what was configured in the BMC.
- 8. Leave the default settings for the other boxes. Click "OK" to accept the settings and enter the Hyperterminal screen.
- 9. You will now see characters being displayed to the Hyperterminal screen. This is the PING message sent by the BMC.
- 10. Press the <ESC> key followed by the "(" key to enable Terminal Mode and end the PING messages. "[TMODE OK]" is displayed.
- 11. Type "[SYS TMODE]", it is case sensitive and must be in uppercase. The response back will be "[OK TMODE]" indicating that Terminal Mode is functioning.

Logging Into the Terminal Mode Session

- 1. Remember that "guest" was the password that we set for the Anonymous User in the BMC.
- 2. At the Hyperterminal screen enter "[SYS PWD -N guest]" to login. The "-N" represents the Anonymous User and "guest" is the password. These are case sensitive.
- 3. The screen returns "[sys]" and "[ok]" to show a successful login.
- 4. At this point, you can type any supported Terminal mode command.
- 5. To logout type "[SYS PWD -X]".

User Configuration

A user must be configured via the SMU to make full use of terminal mode. To create a user, navigate to the SMU user configuration screen. Enter any username and password combinations desired. Make sure to check the box that enables a particular user for use on the serial channel. If this is not done, the username will not be useable on the serial channel for terminal mode. Configure the user with the desired maximum privilege level.

Username and Password Restrictions

Spaces, left bracket characters or right bracket characters are not allowed in usernames or passwords used with terminal mode.

Be sure to save the new user information when you are done editing the user settings!

Terminal Mode Configuration

Terminal mode has several configuration parameters that determine behavioral characteristics of the terminal mode interactions with the remote console. They are outlined below and in the terminal mode configuration parameters table. See the terminal mode configuration parameters table for the BMC default settings of each parameter.

Line Editing

When this option is enabled, it allows you to make changes to the input line before submitting it to the BMC for processing. When line editing is enabled, it is recommended that echo be enabled as well.

Echo

When this option is enabled, the BMC echoes each character it receives to the remote console.

Handshaking

When this option is enabled, the BMC will output the following string as soon as the BMC is ready to accept another message from the remote console.

Handshake string: [SYS]<newline sequence>

Delete Control Sequence

This option allows you to specify the delete control sequence for the BMC to use when the delete or backspace key is pressed. The following delete control sequences are supported:

 - The BMC outputs a delete character

<BKSP><SP>< BKSP > - The BMC outputs a backspace, space, backspace character sequence

This delete control sequence is only valid when line editing is enabled. If line editing is not enabled, the delete key or backspace key are treated as illegal characters.

Input Newline Sequence

This option allows you to specify the input newline sequence for the BMC to expect during remote console to BMC communications. The following input newline sequences are supported:

<NULL> - The NULL character (0x00)

<CR> - The carriage return character

Output Newline Sequence

This option allows you to specify the output newline sequence for the BMC to output during BMC to remote console communications.

The following output newline sequences are supported:

- <no termination sequence> No character sequence is used to indicate output newlines
- <CR-LF> The carriage return line feed character sequence
- <NULL> The NULL character (0x00)
- <CR > -The carriage return character
- <LF-CR> The line feed carriage return character sequence
- <LF> The line feed character

Be sure to save the new terminal mode configuration when you are done editing the terminal mode settings!

Security Information

Access to the BMC via terminal mode is governed by the proper setup of usernames and password via the SMU. A session must be established with the BMC prior to accepting any terminal mode commands. A limited selection of text commands and binary hex-ASCII commands that are assigned the lowest IPMI privilege level are available prior to session establishment with the BMC.

Since the terminal mode password is sent via clear text, it is highly desirable that the terminal mode session takes place in a secure location over a secure link, preferably via a direct connection. Connection via a modem is supported but not recommended.

Terminal Mode Commands

Input Restrictions

Terminal mode messages are bound by the restrictions listed in the following subsections.

Syntax

Terminal mode messages follow the general syntax below:

[<message data>]<newline sequence>

Each terminal mode message must be preceded with the left bracket "start" character and must be ended with a right bracket "stop" character and the appropriate input newline sequence.

No input characters are accepted until the start character has been received.

Terminal mode text commands are case sensitive, but hex-ASCII commands can either use upper or lower case letters for ASCII representations of hex digits.

Command Length

Terminal mode messages are limited to a maximum length of a 122 characters. This includes the left and right brackets, but not control characters.

Character Support

Terminal mode messages are allowed to be composed of standard printable ASCII characters. All other characters are treated as illegal characters.

Special Character Handling - <ESC> character

The <ESC> character can be used to delete an entire message prior to submission to the BMC for processing. If line editing is enabled, and the <ESC> key is followed by an input newline sequence, the BMC responds by outputting an output newline sequence. Otherwise, the BMC goes back to looking for the start character.

Special Character Handling - or <BKSP> character

The <BKSP> or key can be used to delete the last character entered if the message has not been submitted to the BMC yet.

Special Character Handling - Line Continuation character

Long IPMI messages can be split across multiple lines by using the line continuation <BACKSLASH> character followed immediately by an input newline sequence. Line continuation character usage is supported for both text and hex-ASCII commands.

Special Character Handling - Illegal characters

Any illegal characters received by the BMC clears the message in progress and forces the BMC back to looking for the start character.

Hex-ASCII Command Format

Binary IPMI commands are sent and received as a series of case insensitive hex-ASCII pairs, where each is optionally separated from the preceding pair by a single <space> character. The following is an example of a binary IPMI request message:

[18 00 22]<newline sequence>

The software ID and LUN for the remote console are fixed and implied by the command. The SWID for messages to the remote console is always 47h, and the Logical Unit Number (LUN) is 00b.

Instead, there is a 'bridge' field that is used to identify whether the message should be routed to the BMC's bridged message tracking or not. See the Terminal Mode IPMI Message Bridging section for more information.

Table 23. Terminal Mode Request to BMC

Byte	Explanation
1	[7:2] – Net Function (even) [1:0] – Responder's LUN
2	[7:2] – Requester's Sequence Number [1:0] – Bridge field
3	Command Number
4:N	Data

Table 24. Terminal Mode Request from BMC

Byte	Explanation
1	[7:2] – Net Function (odd) [1:0] – Responder's LUN
2	[7:2] – Requester's Sequence Number [1:0] – Bridge field
3	Command Number
4	Completion Code
5:N	Data

Text Command Format

Text commands do not support the bridging and sequence number fields present in the hex-ASCII commands, are case sensitive, and are preceded by a prefix consisting of the string "SYS".

Examples

Hex-ASCII command example (IPMI Reset Watchdog Cmd):

[18 00 22]<CR>

[1C 00 22 00]<CR-LF>

Text command example:

[SYSTMODE]<CR>

[OKTMODE]<CR-LF>

Terminal Mode IPMI Message Bridging

Terminal mode supports the ability to bridge IPMI messages to another interface when binary hex-ASCII IPMI commands are used. The message bridge is determined by the following: the bridge field, whether the message is a request or a response, the message direction with respect to the BMC and the LUN. Table 25 lists the supported BMC combinations for IPMI message bridging. Any other combinations are unsupported.

Note that IPMI messages to and from the system interface are transferred using the BMC SMS (System Management Software) LUN, 10b, and with the bridge field set to 00b.

Table 25. Supported BMC Combinations for IPMI Message Bridging

Bridge Field	Request/ Response	Message Direction (to BMC)	LUN	Message Interpretation
00b	Request	In	00b, 01b, 11b	Remote Console request to BMC functionality Message is a request from the remote console to the BMC
00b	Response	Out	00b, 01b, 11b	Response to Remote Console from BMC functionality Message is a response to an earlier request from the remote console to the BMC
00b	Request	In	10b	Remote Console request to SMS Message is a request from the remote console to SMS via the Receive Message Queue
00b	Response	Out	10b	SMS Response to Remote Console Message is a response to an earlier request from SMS
01b	Response	Out	Any	Response to earlier Bridged Request from Remote Console Message is the asynchronous response from an earlier bridged request that was encapsulated in a Send Message command issued to the BMC by the remote console

Table 26. Terminal Mode Text Commands

Command	Switches	Description
SYS PWD	-U USERNAME <password></password>	Used to activate a terminal mode session. USERNAME corresponds to the ASCII text for the username. <pre></pre>
		Either the SYS PWD command (or Activate Session IPMI message) must be successfully executed before any command or IPMI messages are accepted. Note that a modem connection may be automatically dropped if multiple bad passwords are entered.
	-N <password></password>	-N represents a Null username. <password> represents a printable password (up to 16 characters). If <password> is not provided, then a Null password (all binary 0's) is submitted. Passwords are case sensitive.</password></password>
		Either the SYS PWD command (or Activate Session IPMI message) must be successfully executed before any command or IPMI messages are accepted. Note that a modem connection may be automatically dropped if multiple bad passwords are entered.
	-X	-X immediately 'logs out' any presently active session. Entering an invalid password with -U or -N also has the same effect.
SYSTMODE		Used as a 'no-op' confirm that Terminal Mode is active. BMC returns an OK response followed by "TMODE".
SYS SET BOOT XX YY ZZ AA BB		Sets the boot flags to direct a boot to the specified device following the next IPMI command or action initiated reset or power-on. XXBB represent five hex-ASCII encoded bytes, which are the boot flags parameter in the Boot Option Parameters. See the Boot Option Parameters Table below for more information. Upon receiving this command, the BMC automatically sets the 'valid bit' in the boot options and sets all the Boot Initiator Acknowledge data bits to 1b.

Table 26. Terminal Mode Text Commands (continued)

Command	Switches	Description
SYS SET BOOTOPT XXYYNN		This is essentially a text version of the IPMI "Set System Boot Options" command. It allows any of the boot option parameters to be set, not just the boot flags. XXYYNN represent the hex-ASCII encoding for the data bytes that are passed in the Set System Boot Options request. See the Boot Option Parameters Table below for more information. XX - Parameter valid [7] - 1b = Mark parameter invalid / locked
		Per Boot Option Parameters Table below. Passing 0-bytes of parameter data allows the parameter valid bit to be changed without affecting the present parameter setting.
SYS GET BOOTOPT XXYY ZZ		This is essentially a text version of the IPMI "Get System Boot Options" command. It allows any of the boot option parameters to be retrieved.
		XXYY ZZ represents the hex-ASCII for the data bytes that are passed in the Get System Boot Options request.
		The BMC returns the data from the command in hex-ASCII format. See the Boot Option Parameters Table below for more information.
		XX - Parameter selector [7] -Reserved [6:0] - Boot option parameter selector
		YY - Set Selector [7:0] -Selects a particular block or set of parameters under the given parameter selector Write as 00h if parameter does not use a Set Selector ZZ - Block Sel3ector
		Selects a particular block within a set of parameters
		Write as 00h if parameter does not use a Block Selector. Note: As of this writing, there are no IPMI-specified Boot Options parameters that use the block selector. However, this field is provided for consistency with other configuration commands and as a placeholder for future extension of the IPMI specification.
SYS SET TCFG		Returns the Terminal Mode Configuration bytes where XX and YY represent hex-ASCII encoding for the volatile version of data bytes 1 and 2 as specified in the Terminal Mode Configuration Table below, and AA BB represent hex-ASCII encoding of the non-volatile version.
		V:XXYY <output sequence="" termination=""> N:AA BB<output sequence="" termination=""></output></output>
	-V XXYY	This command sets the volatile Terminal Mode Configuration. XX and YY represent hex-ASCII encoding for data bytes 1 and 2 as specified in the Terminal Mode Configuration Table below. The BMC returns the same output as for SYS SETTCFG, above.
	-N XXYY	This command sets the non-volatile Terminal Mode Configuration. XX and YY represent hex-ASCII encoding for data bytes 1 and 2 as specified in the Terminal Mode Configuration Table below. The BMC returns the same output as for SYS SETTCFG, above.
SYS RESET		Directs the BMC to perform an immediate system hard reset.

Table 26. Terminal Mode Text Commands (continued)

Command	Switches	Description
SYS POWER OFF		Directs the BMC to perform an immediate system power off.
SYS POWER ON		Causes the BMC to initiate an immediate system power on.
SYS HEALTH QUERY		Causes the BMC to return a high level version of the system health status in 'terse' format. The BMC returns a string with the following format if the command is accepted. PWR:zzz H:xx T:xx V:xx PS:xx C:xx D:xx S:xx O:xx Where: PWR is system POWER state H is overall Health T is Temperature V is Voltage PS is Power Supply subsystem F is cooling subsystem (Fans) D is Hard Drive / RAID Subsystem S is physical Security O is Other (OEM) zzz is: "ON," "OFF" (soft-off or mechanical off), "SLP" (sleep - used when sleep level cannot be distinguished), "S4", "S3", "S2", "S1", "??" (unknown) and xx is: ok, nc, cr, nr, uf, or ?? where: "ok" = OK (monitored parameters within normal operating range) "nc" = non-critical ('warning': hardware outside normal operating range) "cr" = critical ('fatal': hardware exceeding specified ratings) "nr" = non-recoverable ('potential damage': system hardware in jeopardy or damaged) "uf" = unspecified fault (fault detected, but severity unspecified) "?" = status not available/unknown (typically because system power is OFF)
	-V	Causes the BMC to return a high level version of the system health status in multi-line 'verbose' format. The BMC returns a string of the following format: SYS Health:xx <output sequence="" termination=""> Power: "ON", "OFF" (soft-off or mechanical off), "SLEEP" (sleep - used when can't distinguish sleep level), "S4", "S3", "S2", "S1", "Unknown" Temperature:xx<output sequence="" termination=""> Voltage:xx<output sequence="" termination=""> PowerSystem:xx<output sequence="" termination=""> Cooling:xx<output sequence="" termination=""> Drives:xx<output sequence="" termination=""> Security:xx<output sequence="" termination=""> Other:xx<output sequence="" termination=""> Where xx is: "OK" (monitored parameters within normal operating ranges) "Non-critical" ('warning': hardware outside normal operating range) "Critical" ('fatal' :hardware exceeding specified ratings) "Non-recoverable" ('potential damage': system hardware in jeopardy or damaged) "Unspecified fault" (fault detected, but severity unspecified) "Unknown" (status not available/unknown (typically because system power is OFF)</output></output></output></output></output></output></output></output>

Table 27. Boot Option Parameters

Parameter	#	Parameter Data (non-volatile unless otherwise noted)
Set In Progress (volatile)	0	Data 1 -This parameter is used to indicate when any of the following parameters are being updated, and when the updates are completed. The bit is primarily provided to alert software that some other software or utility is in the process of making changes to the data. The change shall take effect when the write occurs. [7:2] - Reserved
		[1:0] - 00b = Set complete. If a system reset or transition to powered down state occurs while 'set in progress' is active, the BMC goes to the 'set complete' state. If rollback is implemented, going directly to 'set complete' without first doing a 'commit write' causes any pending write data to be discarded.
		01b = Set in progress. This flag indicates that some utility or other software is presently doing writes to parameter data. It is a notification flag only, it is not a resource lock. The BMC does not provide any interlock mechanism that would prevent other software from writing parameter data while. 10b = Reserved
		11b = Reserved
Service partition selector (semi- volatile) ^[1]	1	Data 1 [7:0] - Service partition selector. This value is used to select which service partition BIOS should boot using. This document does not specify which value corresponds to a particular service partition. 00h = Unspecified
Service partition scan	2	Data 1 [7:2] - Reserved
(semi- volatile) ^[1]		[1] - 1b = Request BIOS to scan for specified service partition. BIOS clears this bit after the requested scan has been performed.
		[0] - 1b = Service Partition discovered. The BIOS sets this bit to indicate it has discovered the specified service partition. The BIOS must clear this bit on all system resets and power ups, except when a scan is requested.
BMC boot flag valid bit	3	<u>Data 1</u> - BMC boot flag valid bit clearing. Default = 0000b. [7:5] - Reserved
clearing (semi- volatile) ^[1]		 [4] - 1b = Do not clear valid bit on reset/power cycle caused by PEF [3] - 1b = Do not automatically clear boot flag valid bit if IPMI Chassis Control command not received within 60-second timeout (countdown restarts when a IPMI Chassis Control command is received)
		[2] - 1b = Do not clear valid bit on reset/power cycle caused by watchdog timeout
		[1] - 1b = Do not clear valid bit on pushbutton reset / soft-reset (e.g. "Ctrl-Alt-Del")
		[0] - 1b = Do not clear valid bit on power up via power pushbutton or wake event

Table 27. Boot Option Parameters (continued)

Parameter	#	Parameter Data (non-volatile unless otherwise noted)
Boot info acknowledge (semi- volatile) ^[1]	4	These flags are used to allow individual parties to track whether they've already seen and handled the boot information. Applications that deal with boot information should check the boot info and clear their corresponding bit after consuming the boot options data.
		Data 1: Write Mask ('write-only'. This field is returned as 00h when read. This is to eliminate the need for the BMC to provide storage for the Write Mask field.)
		[7] - 1b = enable write to bit 7 of Data field [6] - 1b = enable write to bit 6 of Data field [5] - 1b = enable write to bit 5 of Data field [4] - 1b = enable write to bit 4 of Data field [3] - 1b = enable write to bit 3 of Data field [2] - 1b = enable write to bit 2 of Data field [1] - 1b = enable write to bit 1 of Data field [0] - 1b = enable write to bit 0 of Data field
		Data 2: Boot Initiator Acknowledge Data The boot initiator should typically write FFh to this parameter prior to initiating the boot. The boot initiator may write 0's if it wants to intentionally direct a given party to ignore the boot info. This field is automatically initialized to 00h when the management controller is first powered up or reset.
		 [7] - reserved. Write as 1b. Ignore on read [6] - reserved. Write as 1b. Ignore on read [5] - reserved. Write as 1b. Ignore on read [4] - 0b = OEM has handled boot info [3] - 0b = SMS has handled boot info [2] - 0b = OS / service partition has handled boot info [1] - 0b = OS Loader has handled boot info [0] - 0b = BIOS/POST has handled boot info
Boot flags (semi- volatile) ^[1]	5	Data 1 [7] - 1b = Boot flags valid. The bit should be set to indicate that valid flag data is present. This bit may be automatically cleared based on the boot flag valid bit clearing parameter, above [6:0] - Reserved
		BIOS support for the following flags is optional. If a given flag is supported, it must cause the specified function to occur in order for the implementation to be considered to be conformant with this specification.
		The following parameters represent temporary overrides of the BIOS default settings. BIOS should only use these parameters for the single boot where these flags were set. If the bit is 0b, BIOS should use its default configuration for the given option.
		Data 2 [7] - 1b = CMOS clear [6] - 1b = Lock Keyboard [5:2] - Boot device selector 0000b = No override 0001b = Force PXE 0010b = Force boot from default Hard-drive ^[2] 0011b = Force boot from default Hard-drive, request Safe Mode ^[2] 0100b = Force boot from default Diagnostic Partition ^[2]
		0101b = Force boot from default CD/DVD ^[2] 0110b-1110b = Reserved 1111b = Force boot from Floppy/primary removable media [1] - 1b = Screen Blank
		[0] - 1b = Lock out Reset buttons

Table 27. Boot Option Parameters (continued)

Parameter	#	Parameter Data (non-volatile unless otherwise noted)
Boot flags (semi- volatile) ^[1] (continued)	5	Data 3 [7] - 1b = Lock out (power off/ sleep request) via Power Button [6:5] - Firmware (BIOS) Verbosity (Directs what appears on POST display) 00b = System default 01b = Request quiet display 10b = Request verbose display 11b = reserved [4] - 1b = Force progress event traps. When set to 1b, the BMC transmits PET traps for BIOS progress events to the LAN or serial/modem destination for the session that set the flag. Since this capability uses PET traps, this bit is ignored if for connection modes that do not support PET such as Basic Mode and Terminal Mode [3] - 1b = User password bypass. When set to 1b, the managed client's BIOS boots the system and bypasses any user or boot password that might be set in the system [2] - 1b = Lock Sleep Button. When set to 1b, directs BIOS to disable the sleep button operation for the system, normally until the next boot cycle [1:0] -00b = Console redirection occurs per BIOS configuration setting 01b = Suppress (skip) console redirection if enabled 10b = Request console redirection be enabled
		11b = Reserved Data 4 [7:4] - Reserved [3] - BIOS Shared Mode Override Can be used to request BIOS to temporarily place the channel into Shared access mode. Per the recommendations in the IPMI specification, 'Shared' access would cause the baseboard serial controller to both remain enabled after POST/ start of OS boot, while also allowing the BMC to be accessible. This can be useful when booting to an alternative device such as a Diagnostic Partition since it means the partition can use the serial port but that communication
		with the BMC can remain available if the partition software fails. 1b = Request BIOS to temporarily set the access mode for the channel specified in parameter #6 to 'Shared'. This is typically accomplished by sending a 'Set Channel Access' command to set the volatile access mode setting in the BMC 0b = No request to BIOS to change present access mode setting [2:0] - BIOS Mux Control Override Can be used to request BIOS to force a particular setting of the serial/
		modem mux at the conclusion of POST / start of OS boot. This override takes precedence over the mux settings for the access mode even if the BIOS Shared Mode Override is set. 000b = BIOS uses recommended setting of the mux at the end of POST (See IPMI specification for more info) 001b = Requests BIOS to force mux to BMC at conclusion of POST/start of OS boot. If honored, this overrides the recommended setting of the mux at the end of POST (See IPMI specification for more info) 010b = Requests BIOS to force mux to system at conclusion of POST/start of OS-boot. If honored, this overrides the recommended setting of the mux at the end of POST. (See IPMI specification for more info) Data 5 - Reserved

Table 27. Boot Option Parameters (continued)

Parameter	#	Parameter Data (non-volatile unless otherwise noted)
Boot initiator info (semi- volatile) ^[1]	6	Address & Identity information for the party that initiated the boot. The party that initiates the boot writes this parameter and the boot info acknowledge parameter prior to issuing the command that causes the system power up, power cycle, or reset. This data is written by the remote console application, not the BMC. Boot Source
		Data 1- Channel Number. Channel that delivers the boot command
		(e.g. chassis control). BIOS and boot software (e.g. service partition or OS loader) can use the Get Channel Sessions to find out information about the party that initiated the boot
		[7:4] - Reserved
		[3:0] - Channel Number
		Data 2:5 - Session ID. Session ID for session that the boot command will be issued over. This value can be used with the Get Channel Sessions command to find out information about the party that initiated the boot
		<u>Data 6:9</u> - Boot Info Timestamp. This timestamp is used to help software determine whether the boot information is 'stale' or not. A service partition or OS loader may elect to ignore the boot information if it is older than expected.
		The boot initiator should load this field with the timestamp value from the IPMI Get SELTime command prior to issuing the command that initiates the boot.
Boot initiator mailbox	7	This parameter is used as a 'mailbox' for holding information that directs the operation of the OS loader or service partition software.
(semi- volatile) ^{[1][2]}		Note: Since this information is retained by the BMC and may be readable by other software entities, care should be taken to avoid using it to carry 'secret' data.
		<u>Data1:</u> Set Selector = Block selector
		Selects which 16-byte info block to access. 0-based.
		Data 2: (17) Block data
		The first three bytes of block #0 are required to be an IANA Enterprise ID Number (least significant byte first) for the company or organization that has specified the loader.
		Up to 16-bytes per block of information regarding boot initiator, based on protocol and medium.
		The BMC supports five blocks of storage for this command. Previous values are overwritten. The BMC does not automatically clear any remaining data bytes if fewer than 16 bytes are written to a given block.
All other parameters	All Others	Reserved

^{1.} The designation 'semi-volatile' means that the parameter will be kept across system power cycles, resets, system power on/off, and sleep state changes, but will not be preserved if the management controller loses standby power or is cold reset. Parameters designated as 'semi-volatile' are initialized to 0's upon controller power up or hard reset, unless otherwise specified.

^{2.} IPMI allows software to use the boot initiator mailbox as a way for a remote application to pass OEM parameters for additional selection of the boot process and direction of the startup of post-boot software. If additional parameters are not included, the system boots the primary/first-scanned device of the type specified.

Table 28. Terminal Mode Configuration

Byte	Explanation
1	 [7:6] - Reserved [5] - Line Editing Ob = Disable 1b = Enable (Factory default) [4] - Reserved [3:2] - Delete control (only applies when line editing is enabled) O0b = BMC outputs a character when <bksp> or < DEL > is received O1b = BMC outputs a < BKSP >< SP >< BKSP > sequence when < BKSP > or < DEL > is received (Factory default)</bksp> [1] - Echo control0b = No echo 1b = Echo (BMC echoes characters it receives) (Factory default) [0] - Handshaking - BMC outputs a [SYS]<newline> after receiving each terminal mode IPMI message and is ready to accept the next message 0b = Disable 1b = Enable (Factory default)</newline>
2	[7:4] - Output newline sequence (BMC to console). Selects what characters the BMC uses as the <newline> sequence when the BMC writes a line to the console in Terminal Mode 0h = no termination sequence 1h = <cr-lf> (Factory default) 2h = <null> 3h = <cr> 4h = <lf-cr> 5h = <lf> All other = reserved [3:0] - Input newline sequence (Console to BMC). Selects what characters the console uses as the <newline> sequence when writing to the BMC in Terminal Mode 0h = reserved 1h = <cr> (Factory default) 2h = <null> All other = reserved</null></cr></newline></lf></lf-cr></cr></null></cr-lf></newline>

Hot-swapping System Components

Tools and Supplies Needed

- Pen or pencil
- Antistatic wrist strap (recommended)

Equipment Log

To record the model and serial numbers of the server, all installed options, and any other pertinent information about the server, see Appendix B "Equipment Log and Configuration Worksheet".

Hot-swapping System Fans

The four 120-mm cooling fans are mounted in pairs below the back top cover of the chassis. You can remove and install these fans without turning the server system power off. Each fan uses an amber LED to indicate the failed fan. When an LED lights, you need to replace the fan.



WARNING

Make sure that the rack is anchored securely so it will not tilt forward when the server chassis is extended. A crush hazard exists should the rack tilt forward which could cause serious injury.



Do not leave the back top cover open or a system fan removed for longer than two minutes; system cooling is reduced.

- 1. If the chassis is rack-mounted, slide the chassis out far enough to expose the back top cover (see warning above).
- 2. Unlatch the back top cover by pressing the latches (A in Figure 60) and sliding the cover (B in Figure 60).

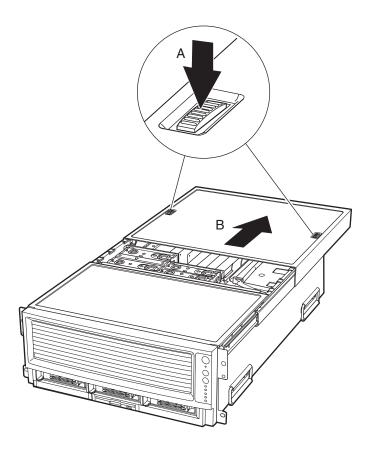


Figure 60. Opening the Back Top Cover

- 3. Locate the fan you are replacing. If it is a failed fan, the amber LED on the failed fan will be lit.
- 4. Place your fingers into the fan holes and squeeze your fingers together to release the fan latch and pull the fan out.

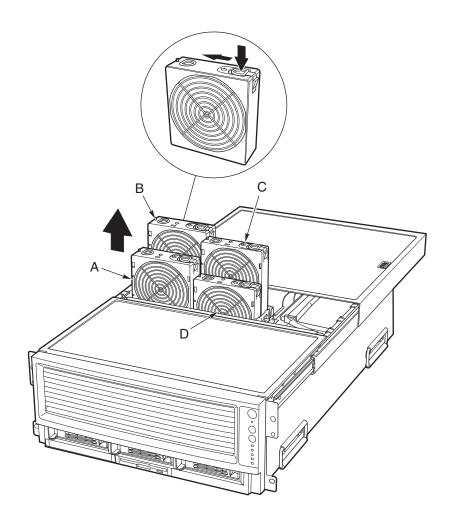


Figure 61. System Fan Location and Removal

A. and **B.** 120 x 38 mm System Fans **C.** and **D.** 120 x 25 mm System Fans

Hot-swapping Hard Disk Drives

The procedures in this section describe how to determine drive status, remove a faulty drive, and install a new drive.

Determining Drive Status

The carriers contain light-pipes that allow dual color LED indicators to show through the bezel to display hard disk drive status as described in Table 29.

Table 29. SCSI Drive Status LED Descriptions

Feature	Description	
Green, flashing	Indicates the hard drive is active	
Yellow/Green flashing	Indicates a hard drive fault status and hard drive is active	
Yellow/Blank flashing	Indicates a hard drive fault status	
Not illuminated	Hard drive is powered	

Removing a Hard Disk Drive

- 1. Examine the amber LEDs above the Hard Drive Bays to determine which drive has failed. See Table 29 for information on how to interpret the LEDs.
- 2. Pull the drive carrier latch open and use the handle to pull the drive assembly toward you as shown by the arrows in Figure 62.
- 3. Slide the assembly out of the bay and place it on a clean, static-free work surface.

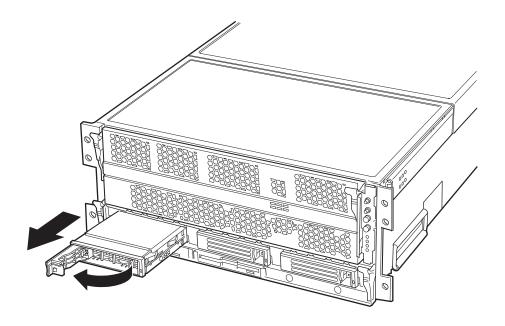


Figure 62. Removing a Hard Disk Drive

Installing a Hard Disk Drive

NOTE

If you need to mount the new drive into the hard drive carrier, see "Mounting a Hard Disk Drive in a Carrier".

- 1. With the drive carrier handle open fully, place the drive carrier in the peripheral drive bay and slide the drive carrier all the way into the drive bay.
- 2. Using the drive carrier handle, firmly push the assembly into the bay until the drive docks with the SCSI backplane connector.
- 3. Swing the drive carrier handle closed until it latches.

Hot-swapping Power Supplies



!\ CAUTION

Because of chassis airflow disruption, a power supply bay should never be vacant (without a power supply or a filler panel) for more than five minutes when the server power is on. Exceeding fiveminutes might cause the system to exceed the maximum acceptable temperature and possibly damage system components.

In a fully configured system (see Figure 63), the power system contains two 1200-watt auto ranging power supplies. If you have only one power supply installed, it must occupy power supply bay A and a filler panel must be installed in power supply bay B. For 120 VAC input, two power supply modules must be installed for normal operation.

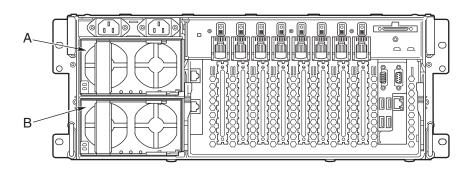


Figure 63. Power Supply Installation Order

Determining Power Supply Status

Each power supply has three LEDs that indicate whether power is supplied to the power supply and the health of the power supply. Table 30 provides more detail on the three LEDs.

Table 30. Power Supply LEDs

PWR (Power) Green LED	PFAIL (Predictive Failure) Amber LED	FAIL (Power Supply Failure) Amber LED	Description
Off	Off	Off	No AC power to any power supplies
Off	Off	On	No AC power to a specific power supply or power supply failure
O Blinking	Off	Off	AC present / Standby output on
On	Off	Off	DC outputs on and okay
On	Off	O Blinking	Current limit
On	O Blinking	Off	Predictive failure

Removing a Power Supply



⚠ CAUTION

Any unused power supply slots must be covered with a filler panel. Uncovered slots can disrupt the airflow used for cooling the system.

- 1. Locate the power supply you want to remove.
- 2. Push the thumb latch (A in Figure 64 to unlock the power supply handle and pull the handle (in direction B in Figure 64) to undock the supply.
- 3. Pull the power supply out of the chassis and set the power supply aside.

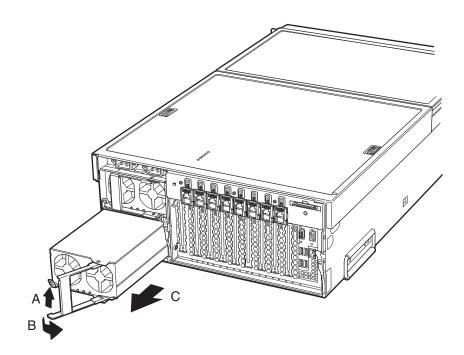


Figure 64. Removing a Power Supply

Installing a Power Supply

- 1. Remove the new power supply from the protective packaging, and place it on a clean ESD-protected work surface.
- 2. Record the model and serial numbers of the power supply in your equipment log. See Appendix B for the equipment log.
- 3. Remove the filler panel from the back panel of the chassis if installed.
- 4. Slide the replacement power supply partway into the power supply bay (A in Figure 65).
- 5. Verify that the locking handle (B in Figure 65) is open.
- 6. With the handle in the open position, slide power supply into the power supply bay until it stops.
- 7. As shown by arrow B in Figure 65, rotate the handle to lock the power supply into place.
- 8. Check the new power supply's LEDs to verify proper power supply function.

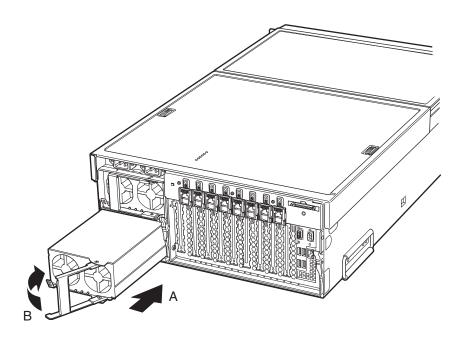


Figure 65. Installing a Power Supply

Hot Plugging PCI Add-in Cards

Before replacing a hot-plug PCI I/O card without shutting down the server, use the operating system or a resident GUI to shut down or power off the PCI I/O slot you are working on. Verify that the green power LED for the slot is off before replacing the card.



! CAUTION

The I/O bay should not be extracted from the chassis to hot-plug PCI cards. Instead, slide the back top cover open to gain access.

Removing Hot-plug PCI Add-in Cards



WARNING

Make sure that the rack is anchored securely so it will not tilt forward when the server chassis is extended. A crush hazard exists should the rack tilt forward which could cause serious injury.



Expansion slot covers must be installed on all vacant slots to maintain the electromagnetic emission characteristics of the server and to ensure proper cooling of the system.

- 1. Observe the safety precautions, warnings, and cautions described in "Warnings and Cautions".
- 2. If your server is operating, use your operating system or GUI application to power down the PCI slot that contains the board you are going to remove. NOTE: the Attention switch on the back of the chassis will not be supported until a Post Platform Release BIOS. Please check the BIOS release notes of the BIOS installed on the system to verify whether using the Attention button to initiate the slot power down is supported.
- 3. The green power LED blinks and turns OFF.
- 4. If the system is mounted in a rack, pull the chassis out of the rack as far as it'll go.
- 5. Open the rear cover to expose the hot-plug PCI slots.
- 6. Verify the green power LED for the slot you are working with is turned off.
- 7. Disconnect any cables attached to the board you are removing.
- 8. Press the center of the retention latch that secures the end of the board nearest the rear of the I/O bay (A in Figure 66). When the mechanism clicks open, rotate it downward.
- 9. Release the plastic retaining mechanism that secures the end of the board nearest the front of the I/O bay (B in Figure 66).
- 10. Release the plastic retaining mechanism that secures the end of the board nearest the front of the I/O bay (B in Figure 66).
- 11. Carefully pull the add-in card (C in Figure 66) up and out of the system. Make sure that you do not scrape the board against other components.



Figure 66. Removing a Hot-plug PCI Add-in Card

- 12. Store the board in an antistatic protective wrapper.
- 13. Install an expansion slot cover over the vacated slot by aligning the cover with the slot from the rear of the chassis and pressing the cover into the slot. If you are installing a new board, begin with step 5 in Installing Hot-plug PCI Add-in Cards below.
- 14. Close the chassis top cover.
- 15. If the system is installed in a rack, push the system back into the cabinet rack.

Installing Hot-plug PCI Add-in Cards

- 1. Observe the safety precautions, warnings, and cautions described in "Warnings and Cautions".
- 2. If your server is operating, use your operating system or GUI application to make sure the PCI slot that you are installing the board into is powered down.
- 3. If the system is mounted in a rack, pull the chassis out of the rack as far as it'll go.



WARNING

Make sure that the rack is anchored securely so it will not tilt forward when the server chassis is extended. A crush hazard exists should the rack tilt forward which could cause serious injury.

- 4. Open the top cover to expose the hot-plug PCI slots.
- 5. Being careful not to touch the components or gold edge connectors on the add-in board, remove it from its protective wrapper, and place it on a clean ESD-protected work surface.
- 6. Record in your log the serial number of the board and any jumpers or switch settings according to the board manufacturer's instructions. See Appendix B for the equipment log.
- 7. Be sure that the plastic latches that secure the ends of the board (A and D in Figure 67) are open so that they will allow the add-in board to be inserted.

\bigcirc **NOTE**

Each PCI slot has four indicator LEDs: two on the outside and two on the inside of the system. The LEDs operate differently depending upon the operating system installed. Please refer to your operating system's manual.

- 8. If necessary, remove the expansion slot cover in the slot you're using by pushing it out from inside the chassis.
- 9. Align and press the add-in board down firmly until it seats in its slot.



⚠ CAUTION

Some accessory/option board outputs exceed Class 2 or limited power source limits and must use appropriate interconnecting cabling in accordance with the national electrical code during installation.

- 10. Rotate the retention latch (C in Figure 67) until it clicks into place. This position both secures the end of the board and allows it to be activated with the operating system or GUI application.
- 11. If the board is long enough to reach the front of the module. Ensure that it is in the slide, and that the securing latch is closed (D in Figure 67).

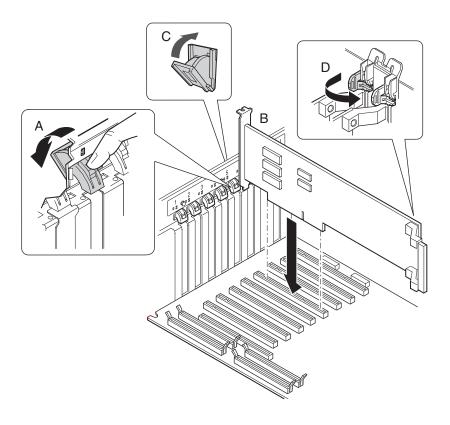


Figure 67. Installing a Hot-plug PCI Add-in Card

- 12. Connect any required cabling to the PCI add-in board.
- 13. Close the back top cover.
- 14. If your server is operating, use the operating system or GUI application to power up the PCI slot into which you installed the PCI card. NOTE: the attention switch on the back of the chassis will not be supported until a Post Platform Release BIOS. Please check the BIOS release notes of the BIOS installed on the system to verify whether using the attention button to initiate the slot power up is supported.
- 15. If the system is installed in an equipment rack, push the system back into place.

5 Warnings

WARNING: English (USA)

AVERTISSEMENTS: Français

WARNUNG: Deutsch

AVVERTENZA: Italiano

ADVERTENCIA: Español

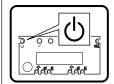
WARNING: English (USA)



The power supply in this product contains no user-serviceable parts. There may be more than one supply in this product. Refer servicing only to qualified personnel.



Do not attempt to modify or use the supplied AC power cord if it is not the exact type required. A product might be equipped with more than one AC power cord.



The power button on the system does not turn off all system AC power. To remove all AC power from the system, you must unplug each AC power cord from the wall outlet or power supply.



To avoid injury from electrical and mechanical hazards, chassis covers should only be removed by qualified service personnel.

SAFETY STEPS: Whenever you remove the chassis covers to access the inside of the system, follow these steps:

- 1. Turn off all peripheral devices connected to the system.
- 2. Turn off the system by pressing the power button.
- 3. Unplug all AC power cords from the system or from wall outlets.
- 4. Label and disconnect all telecommunication cables and all other cables connected to I/O connectors or ports on the back of the system.
- 5. Provide some electrostatic discharge (ESD) protection by wearing an antistatic wrist strap attached to chassis ground of the system—any unpainted metal surface—when handling components.
- 6. Do not operate the system with the chassis covers removed.



After you have completed the six SAFETY steps above, remove the covers as follows:

- 1. To open the top back cover, push the sliding latches on the top of the cover and pull the cover toward the back of the chassis.
- 2. To remove the top back cover, continue to slide the cover toward the back of the chassis until it reaches the end-stops. Press the latch on the left rail slide and pull the cover until it clears the chassis.
- To remove the top front cover, loosen the two captive screws on either side of the cover, slide the cover toward the front of the chassis until it stops, then lift the cover off.
- 4. Always replace the covers before operating the system.

continued

Warning: English (continued)



For proper cooling and airflow, unless hot swapping PCI cards or fans, always reinstall the chassis covers before turning on the system. Operating the system without the covers in place can damage system parts. To install the covers:

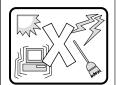
- Check first to make sure you have not left loose tools or parts inside the system.
- Check that cables, add-in boards, and other components are properly installed.
- 3. To replace the top back cover, slide the two bearing cages on the back top cover all the way to the end of the slides.
- 4. Place the top cover on the cover slides and push the cover into place.
- 5. To replace the top front cover, attach the back edge of the front top cover to the chassis, lower the front edge of the cover onto the chassis, then push the cover into place.
- 6. Tighten the two captive screws on either side of the cover.
- 7. Connect all external cables and the AC power cord(s) to the system.



A microprocessor and heat sink might be hot if the system has been running. Also, there might be sharp pins and edges on some board and chassis parts. Contact should be made with care. Consider wearing protective gloves.

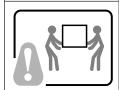


Danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the equipment manufacturer. Discard used batteries according to manufacturer's instructions.



The system is designed to operate in a typical office environment. Choose a site

- Clean and free of airborne particles (other than normal room dust).
- · Well-ventilated and away from sources of heat including direct sunlight.
- Away from sources of vibration or physical shock.
- Isolated from strong electromagnetic fields produced by electrical devices.
- Protected when in regions that are susceptible to electrical storms. We recommend you plug your system into a surge suppresser and disconnect telecommunication lines to your modem during an electrical storm.
- Provided with a properly grounded wall outlet.
- Provided with sufficient space to access the power supply cords, because they serve as the product's main power disconnect.



Servers can be too heavy for a single person to lift or move safely. Depending on the server, use two people or a mechanical assist to lift or move the server.

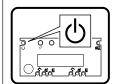
AVERTISSEMENTS: Français



Le bloc d'alimentation de ce produit ne contient aucune pièce pouvant être réparée par l'utilisateur. Ce produit peut contenir plusieurs blocs d'alimentation. Veuillez contacter un technicien qualifié en cas de problème.



Ne pas essayer d'utiliser ni de modifier le câble d'alimentation CA fourni, s'il ne correspond pas exactement au type requis. Un produit peut être équipé de plus d'un câble d'alimentation CA.



Le bouton d'alimentation du système n'éteint pas toutes les alimentations CA du système. Pour mettre complètement le système hors tension, vous devez débrancher chaque cordon d'alimentation CA de sa prise.



Pour éviter toute lésion à la suite de risques électriques et mécaniques, les panneaux du châssis ne doivent être démontés que par un personnel qualifié.

CONSIGNES DE SÉCURITÉ : Lorsque vous retirez les panneaux du châssis pour accéder à l'intérieur du système, suivez les étapes ci-dessous :

- 1. Mettez hors tension tous les périphériques connectés au système.
- 2. Mettez hors tension le système en appuyant sur le bouton d'alimentation.
- 3. Débranchez tous les cordons d'alimentation CA du système ou des prises murales.
- 4. Identifiez et déconnectez tous les câbles de télécommunications et tous les autres câbles reliés aux connecteurs E/S ou aux ports derrière le système.
- 5. Pour prévenir les décharges électrostatiques lorsque vous touchez aux composants, portez une bande antistatique pour poignet et reliez-la à la masse du système (toute surface métallique non peinte du boîtier).
- 6. Ne faites pas fonctionner le système si les panneaux du châssis sont enlevés.



Une fois que vous avez effectué les six étapes de SÉCURITÉ, retirez les panneaux comme indiqué ci-dessous :

- 1. Pour ouvrir le panneau arrière supérieur, poussez sur les loquets coulissants placés sur le dessus du panneau et tirez ce dernier vers l'arrière du châssis.
- 2. Pour retirer le panneau arrière supérieur, continuez à le faire glisser vers l'arrière du châssis, jusqu'à ce qu'il atteigne les butées. Appuyez sur le loquet du rail gauche et retirez le panneau du châssis.
- 3. Pour retirer le panneau avant supérieur, desserrez les deux vis imperdables de chaque côté du panneau, faites glisser ce dernier vers l'avant du châssis au maximum, puis soulevez-le.
- 4. Remettez toujours le panneau en place avant de lancer le système.

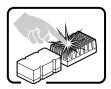
suite

Avertissements : Français (suite)



Pour un refroidissement et une circulation d'air efficaces, remettez toujours en place le panneau avant d'utiliser le système, sauf si vous disposez de cartes PCI ou de ventilateurs échangeables à chaud. Le fonctionnement du système sans les panneaux risque d'endommager ses composants. Pour installer les panneaux :

- 7. Assurez-vous en premier lieu de ne pas avoir oublié d'outils ou de composants à l'intérieur du système.
- 8. Vérifiez que les câbles, les cartes additionnelles et autres composants sont correctement installés.
- 9. Pour remettre en place le panneau supérieur arrière, faites glisser les cages à roulement du panneau jusqu'au bout des glissières.
- 10.Placez le panneau supérieur sur les glissières puis faites-le glisser jusqu'à la position fermée.
- 11. Pour remettre en place le panneau avant supérieur, accrochez la partie arrière du panneau sur le châssis, faites basculer ce dernier vers l'avant vers le châssis, puis poussez pour le bloquer en position fermée.
- 12. Serrez les deux vis imperdables de chaque côté du panneau.
- 13. Connectez tous les câbles externes et le ou les cordons d'alimentation au système.



Le microprocesseur et le dissipateur de chaleur peuvent être chauds si le système a été sous tension. Faites également attention aux broches aiguës des cartes et aux bords tranchants du capot. Les contacts doivent être établis avec soin. L'usage de gants de protection est conseillé.

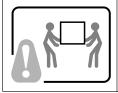


Danger d'explosion si la batterie n'est pas remontée correctement. Remplacer uniquement par une pile du même type ou de type équivalent recommandé par le fabricant. Débarrassez-vous des piles usagées conformément aux instructions du fabricant.



Le système a été conçu pour fonctionner dans un cadre de travail normal. L'emplacement choisi doit être :

- Propre et dépourvu de poussières en suspension (sauf la poussière normale).
- Bien aéré et loin des sources de chaleur, y compris du soleil direct.
- À l'abri des chocs et des sources de vibration.
- Isolé des forts champs électromagnétiques générés par des appareils électriques.
- Protégé s'il se trouve dans des régions sujettes aux orages magnétiques.
 Nous vous recommandons de connecter votre système à un suppresseur de surtension et de déconnecter les lignes de télécommunications de votre modem pendant un orage magnétique.
- Muni d'une prise murale correctement mise à la terre.
- Suffisamment spacieux pour vous permettre d'accéder aux câbles d'alimentation (ceux-ci étant le seul moyen de mettre le système hors tension).

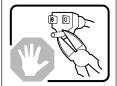


Il se peut que les serveurs soient trop lourds pour qu'une seule personne puisse les soulever et les déplacer en toute sécurité. En fonction du serveur, utilisez deux personnes ou utilisez un équipement mécanique auxiliaire pour soulever ou déplacer le serveur.

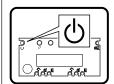
WARNUNG: Deutsch



Das Netzteil dieses Computers enthält keine wartungsbedürftigen Teile. Dieses Produkt kann über mehrere Netzteile verfügen. Überlassen Sie Wartungsarbeiten nur qualifizierten Fachleuten.



Versuchen Sie nicht, das mitgelieferte Netzkabel zu verändern oder einzusetzen, wenn es nicht exakt dem benötigten Kabeltyp entspricht. Das Produkt kann über mehrere Netzkabel verfügen.



Durch Ausschalten des Netzschalters wird die Wechselstromversorgung des Systems nicht unterbrochen. Um das System vom Netz zu trennen, müssen Sie das Netzkabel aus der Steckdose oder vom Netzteil abziehen.



Vermeiden Sie Verletzungen aufgrund elektrischer oder mechanischer Gefahren; lassen Sie daher den Gehäusedeckel nur von technisch qualifiziertem Personal abnehmen.

SICHERHEITSHINWEISE: Beachten Sie beim Abnehmen der Gehäuseabdeckung und Arbeiten im Inneren des Systems folgende Schritte:

- Schalten Sie alle am System angeschlossenen Peripheriegeräte ab. Drücken Sie den Netzschalter, um das System abzuschalten.
- 2. Ziehen Sie alle Wechselstromkabel vom System und den Steckdosen ab.
- 3. Kennzeichnen Sie alle Telekommunikationsleitungen und sonstigen Kabel an den E/A-Steckern bzw. Anschlüssen an der Rückseite des Systems, und trennen Sie diese vom Netz.
- 4. Um sich gegen elektrostatische Entladung zu schützen, sollten Sie eine Antistatik-Manschette tragen, die Sie beim Arbeiten mit Komponenten zur Erdung an einem beliebigen unlackierten Metallteil befestigen.
- 5. Nehmen Sie das System nicht ohne Abdeckung in Betrieb.



Nachdem Sie die sechs bereits beschriebenen Schritte zur SICHERHEIT befolgt haben, können Sie die Abdeckung, wie im folgenden erläutert, abnehmen.

- Zum Öffnen der oberen, rückwärtigen Abdeckung, drücken Sie die Verriegelung oben an der Abdeckung und schieben die Abdeckung an das Ende des Gehäuses.
- 2. Um die obere, rückwärtige Abdeckung abzunehmen, schieben Sie die Abdeckung bis zum Anschlag an das Ende des Gehäuses. Drücken Sie die Verriegelung der linken Schienenkomponente, und ziehen Sie die Abdeckung vollständig vom Gehäuse ab.
- 3. Lösen Sie zum Abnehmen der oberen, vorderseitigen Abdeckung die beiden unverlierbaren Schrauben an beiden Seiten der Abdeckung. Schieben Sie dann die Abdeckung bis zum Anschlag Richtung Vorderseite des Gehäuses, und nehmen Sie sie ab.
- 4. Bringen Sie die Abdeckung vor Inbetriebnahme des Systems wieder an.

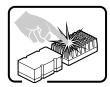
Fortsetzung

Warnung: Deutsch (Fortsetzung)

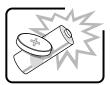


Bringen Sie die Gehäuseabdeckung vor Inbetriebnahme wieder an, um ordnungsgemäße Kühlung und Lüftung zu gewährleisten. Dies gilt nicht für das Hot-Swapping von PCI-Karten oder Ventilatoren. Die Inbetriebnahme des Systems ohne angebrachte Abdeckung kann zur Beschädigung von Systemkomponenten führen. So bringen Sie die Abdeckung wieder an:

- Vergewissern Sie sich zunächst, daß Sie keine Werkzeuge oder Teile im Gehäuse vergessen haben.
- 2. Prüfen Sie, ob Kabel, Erweiterungskarten sowie weitere Komponenten ordnungsgemäß angebracht sind.
- 3. Schieben Sie zur Anbringung der hinteren, rückwärtigen Abdeckung die beiden Haltekomponenten bis zum Anschlag an das Ende der Schiene.
- 4. Legen Sie die obere Abdeckung in die Schienen ein, und schieben Sie die Abdeckung in Position.
- 5. Bringen Sie dann die rückwärtige Kante der oberen, vorderseitigen Abdeckung am Gehäuse an, senken Sie die vordere Kante der Abdeckung auf das Gehäuse, und schieben Sie die Abdeckung in Position.
- 6. Ziehen Sie die zwei unverlierbaren Schrauben an beiden Seiten der Abdeckung fest.
- 7. Schließen Sie wieder alle externen Kabel und Netzstecker an das System an.



Mikroprozessor und Kühlkörper können heiß sein, wenn das System längere Zeit eingeschaltet war. Einige Platinen- und Gehäuseteile können scharfe Spitzen und Kanten aufweisen. Gehen Sie auf jeden Fall mit Vorsicht heran. Das Tragen von Schutzhandschuhen wird empfohlen.

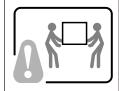


Wird die Batterie unsachgemäß ausgewechselt, besteht Explosionsgefahr. Ersetzen Sie die Batterie nur durch denselben oder einen gleichwertigen Batterietyp, der vom Gerätehersteller empfohlen wird. Entsorgen Sie verbrauchte Batterien gemäß den Herstellerempfehlungen.



Das System ist für den Betrieb innerhalb normaler Büroumgebungen geeignet. Der Standort sollte folgende Anforderungen erfüllen:

- Saubere, möglichst staubfreie Umgebung.
- Gut belüftet und weit entfernt von Wärmequellen wie direkte Sonneneinstrahlung.
- Vibrations- und erschütterungsfreie Umgebung.
- Abgeschirmt von starken elektromagnetischen Feldern, die durch elektrische Geräte erzeugt werden.
- Entsprechender Schutz bei Betrieb in gewittergefährdeten Gebieten. Es empfiehlt sich, den Computer über einen Überspannungsschutz anzuschließen und die Verbindung zwischen dem Modem und dem Telefonanschluß im Falle eines Gewitters zu trennen.
- Ausgestattet mit einer ordnungsgemäß geerdeten Wandsteckdose.
- Sorgen Sie für ausreichend Platz, damit das Servernetzkabel problemlos erreicht werden kann, da das Gerät nur über dieses Kabel vom Netz getrennt wird.



Um einen Server sicher anzuheben und zu bewegen ist eine Person nicht ausreichend. Bewegen Sie den Server, je nach Größe, entweder zu zweit oder mittels einer mechanischen Hilfe.

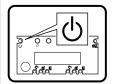
AVVERTENZA: Italiano



L'alimentatore contenuto nel computer non contiene parti riparabili dall'utente. Questo prodotto può essere fornito con più alimentatori. Per l'assistenza fare riferimento solo a personale qualificato.



Non tentare di modificare o utilizzare cavi di alimentazione in c.a. che non siano del tipo prescritto. Un prodotto potrebbe contenere più di un cavo di alimentazione in c.a.



L'interruttore di accensione del sistema non scollega tutta l'alimentazione in c.a. del sistema. Per scollegare tutta l'alimentazione in c.a., è necessario disinserire ogni cavo di alimentazione in c.a. dalla presa a muro o dall'alimentatore.



Per evitare incidenti elettrici e meccanici, i coperchi del telaio devono essere rimossi da personale qualificato.

MISURE DI SICUREZZA: Nel caso sia necessario rimuovere i coperchi del telaio per accedere alle parti interne del sistema, procedere nel seguente modo:

- 1. Spegnere tutte le periferiche collegate al sistema.
- 2. Spegnere il sistema premendo il pulsante di accensione.
- Scollegare tutti i cavi di alimentazione in c.a. dal sistema o dalle prese a muro.
- 4. Apporre un'etichetta e scollegare tutti i cavi di telecomunicazione e i cavi collegati ai connettori di I/O o alle porte sulla parte posteriore del sistema.
- 5. Assicurare un minimo di protezione da scariche elettrostatiche (ESD) indossando un bracciale antistatico collegato a un componente metallico non verniciato del telaio quando si maneggiano i componenti.
- 6. Non attivare il sistema nel caso in cui i coperchi del telaio siano stati rimossi.



Dopo aver effettuato le sei operazioni di SICUREZZA descritte in precedenza, rimuovere i coperchi nel modo seguente:

- Per aprire il coperchio superiore sul retro del sistema, premere le linguette di chiusura sulla parte superiore del coperchio e tirare il coperchio verso la parte posteriore del telaio.
- 2. Per rimuovere il coperchio superiore sul retro del sistema, continuare a far scorrere il coperchio verso la parte posteriore del telaio fino a raggiungerne le estremità. Premere la linguetta di chiusura sulla guida di scorrimento di sinistra e tirare il coperchio fino a liberare il telaio.
- 3. Per rimuovere il coperchio frontale superiore, svitare le due viti su entrambi i lati del coperchio, far scorrere il coperchio verso la parte frontale del telaio fino all'arresto, quindi togliere il coperchio.
- 4. Riposizionare sempre i coperchi prima dell'utilizzo del sistema.

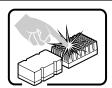
continua

Avvertenza: Italiano (continua)

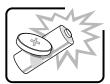


Per evitare che il sistema si surriscaldi e per garantire una ventilazione adeguata, in assenza di schede PCI e ventole sostituibili a computer acceso, reinstallare sempre i coperchi del telaio prima di attivare il sistema. Se si attiva il sistema senza aver riposizionato i coperchi correttamente, alcune parti del sistema potrebbero risultare danneggiate. Per installare i coperchi:

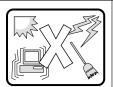
- Verificare innanzitutto di non aver lasciato utensili o altre parti all'interno del sistema
- 2. Verificare che i cavi, le schede aggiuntive e gli altri componenti siano stati installati correttamente.
- 4. Per riposizionare il coperchio superiore del retro del sistema, affiancare le due gabbie cuscinetto sul coperchio superiore del retro fino a raggiungere l'estremità delle guide di scorrimento.
- 5. Posizionare il coperchio superiore sulle guide di scorrimento del coperchio e premere il coperchio fino a raggiungere la posizione corretta.
- 6. Per riposizionare il coperchio frontale superiore, collegare al telaio l'estremità posteriore del coperchio frontale superiore, inserire l'estremità frontale del coperchio sul telaio, quindi spingere il coperchio fino a raggiungere la posizione corretta.
- 7. Stringere le due viti su entrambi i lati del coperchio.
- 8. Collegare tutti i cavi esterni e il cavo o i cavi di alimentazione in c.a. al sistema.



Se il sistema è stato in funzione, il microprocessore e il dissipatore di calore potrebbero essere caldi. Inoltre su alcune parti della scheda e del telaio potrebbero esserci piedini appuntiti e bordi taglienti. Prestare quindi molta attenzione nel toccarli. Indossare guanti protettivi.

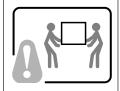


Se sostituita in modo errato, la batteria potrebbe esplodere. Sostituire le batterie scariche solo con batterie originali o del tipo consigliato dal produttore dell'apparecchiatura. Per lo smaltimento delle batterie usate attenersi alle istruzioni del produttore.



Il sistema è concepito per l'utilizzo in ambienti adibiti a ufficio. Scegliere una postazione con le caratteristiche riportate di seguito.

- Pulita, priva di particelle diverse dalla polvere normalmente presente nell'ambiente di lavoro.
- Aerata e lontana da fonti di calore, compresa la luce solare diretta.
- · Lontana da fonti di vibrazione o urti.
- Isolata da forti campi elettromagnetici prodotti da apparecchi elettrici.
- Protetta nelle regioni soggette a temporali. Durante un temporale, si consiglia di collegare il sistema a un limitatore di corrente e di scollegare le linee di telecomunicazione dal modem.
- La posizione prescelta deve essere dotata di una presa a muro con adeguata messa a terra.
- Deve inoltre esserci sufficiente spazio per accedere ai cavi di alimentazione nel caso sia necessario scollegare l'alimentazione principale.

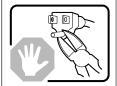


I server possono risultare troppo pesanti per essere sollevati o spostati da una sola persona. Alcuni server devono dunque essere sollevati o spostati da due persone o da un assistente tecnico.

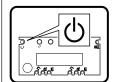
ADVERTENCIA: Español



La fuente de alimentación de este producto no contiene piezas que puedan ser reparadas por el usuario. Puede que haya más de una fuente de alimentación en este producto. Para las reparaciones, consulte sólo con el personal cualificado.



No intente modifica ni utilizar el cable de alimentación de CA suministrado si no es del tipo exacto requerido. Un producto puede estar equipado con más de un cable de alimentación de CA.



El botón de alimentación del sistema no desactiva toda la alimentación de CA del sistema. Para eliminar toda la alimentación de CA del sistema, deberá desenchufar todos los cables de alimentación de CA del enchufe de pared o de la fuente de alimentación.



Para evitar lesiones causadas por descargas eléctricas y mecánicas, únicamente puede retirar las cubiertas de las carcasas el personal técnico cualificado.

PASOS DE SEGURIDAD: Siempre que retire las cubiertas de las carcasas para acceder al interior del sistema, siga las instrucciones que se especifican a continuación:

- 1. Desactive todos los dispositivos periféricos conectados al sistema.
- 2. Pulse el botón de alimentación para desactivar el sistema.
- 3. Desenchufe todos los cables de alimentación de CA del sistema o de los enchufes de pared.
- Etiquete y desconecte todas las líneas de telecomunicaciones y todos los cables conectados a los puertos o conectores de E/S de la parte posterior del sistema.
- 5. Para contar con cierto grado de protección contra descargas electrostáticas (ESD), utilice un brazalete antiestático conectado a la toma de tierra del sistema (cualquier superficie de metal que no esté pintada) al manipular sus componentes.
- 6. No utilice el sistema sin las cubiertas de la carcasa.



Después de haber realizado los seis pasos de seguridad anteriores, puede retirar las cubiertas del sistema de este modo:

- Para abrir la cubierta posterior superior empuje los pestillos deslizantes de la parte superior de la cubierta y tire de ella hacia la parte posterior de la carcasa.
- Para extraer la cubierta posterior superior, siga deslizando la cubierta hacia la parte posterior de la carcasa hasta que alcance los topes finales. Presione el pestillo del raíl de deslizamiento izquierdo y tire de la cubierta hasta que se separe de la carcasa.
- 3. Para retirar la cubierta frontal superior, afloje los dos tornillos de sujeción de cada lado de la cubierta, deslice la cubierta hacia la parte frontal de la carcasa hasta que se detenga y levante la cubierta para extraerla.
- 4. Recuerde siempre volver a colocar las cubiertas antes de utilizar el sistema.

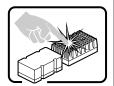
continuación

Advertencia: Español (continuación)



Para conseguir una refrigeración y corriente de aire adecuada, a excepción de las tarjetas PCI o de los ventiladores de intercambio activo, no olvide volver a instalar las cubiertas de la carcasa antes de encender el sistema. Si utiliza el sistema sin las cubiertas, podría dañar sus componentes. Para instalar las cubiertas:

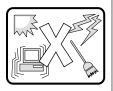
- Compruebe primero que no ha dejado herramientas o piezas sueltas dentro del sistema.
- 2. Compruebe que los cables, tarjetas adicionales y otros componentes están instalados correctamente.
- Para volver a colocar la cubierta posterior superior, ponga los dos cajetines de cojinetes de la cubierta posterior superior al lado del recorrido de los raíles hasta su extremo.
- 4. Coloque la cubierta superior en los raíles de la cubierta y empújela para colocarla en su lugar.
- 5. Para volver a colocar la cubierta frontal superior, acople el borde posterior de la cubierta a la carcasa, baje el borde frontal de la cubierta sobre la carcasa y empújela para colocarla en su lugar.
- 6. Apriete los tornillos de sujeción de cada lado de la cubierta.
- Conecte todos los cables externos y los cables de alimentación de CA al sistema.



Puede que el microprocesador y el disipador de calor se recalienten si se ha estado ejecutando el sistema. Asimismo, puede que algunas tarjetas o piezas de la carcasa tengan patillas o bordes afilados. Los contactos deberán realizarse cuidadosamente. Puede que sea conveniente llevar guantes de protección.

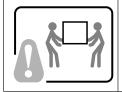


Existe peligro de explosión si la batería se sustituye incorrectamente. Sustitúyala sólo por el mismo tipo o uno equivalente recomendado por el fabricante del equipo. Deseche las baterías usadas según las instrucciones del fabricante.



El sistema está diseñado para que funcione en un entorno de oficina típico. Elija un emplazamiento:

- Limpio y libre de partículas de transportadas por aire (aparte del polvo normal de la habitación).
- Bien ventilado y alejado de las fuentes de calor, incluida la luz del sol directa.
- Alejado de las fuentes de vibración o de los golpes físicos.
- Aislado de campos electromagnéticos fuertes producidos por dispositivos eléctricos.
- Protegido, si se encuentra en regiones susceptibles de tormentas eléctricas.
 Se recomienda que enchufe el sistema a un supresor de sobretensiones y desconecte las líneas de telecomunicaciones al módem durante una tormenta eléctrica.
- Que tenga un enchufe de pared correctamente conectado a tierra.
- Con suficiente espacio para acceder a los cables de la fuente de alimentación, ya que éstos sirven como desconectador de alimentación principal del sistema.



Los servidores pueden ser demasiado pesados para que una sola persona los levante o los mueva de forma segura.

Dependiendo del servido, utilice dos personas o una ayuda mecánica para levantar o mover el servidor.

6 Troubleshooting

Table 31. Symptom/Cause/Solution Troubleshooting Guide

Symptom	Cause(s)	Solution(s)
System does not power up	 DC-to-DC converters not plugged in or bent pins. Boards not fully seated. 	Check seating on all boards and DC-to-DC converters. Check the interconnect LED on the top cover.
System powers on, but then turns off, often with fault light	Bent pin on board set or DC-to-DC converters. Short on one of the boards due to conductive item touching it.	 Check to make sure that you haven't dropped a screw or other conductive item into the system during the upgrade. Check the connections on all boards and DC-to-DC converters. (Begin with those connections that gave you the most trouble during installation. That is typically where a pin may have gotten bent.) Check for bent pins on VHDM connectors. Check for bent pins on processors.
System powers up but does not post	 Boards, power pods, or processors not fully seated. Wrong stepping of processor in system for the BIOS. System speed set higher than processors installed support. Memory not stuffed in documented order or unsupported/validated DIMMS used. 	 Check seating on all boards, DC-to-DC converters, power pods and processors. Make sure you have the FSB to CPU core ratio set appropriately for the processors you're using. Check the BIOS release notes to ensure the BIOS installed on the platform supports the stepping and family of the processors currently installed. Check that you have stuffed the memory banks in the proper order. See system documentation for proper stuffing options. Use only validated DIMMS at least until you've made sure your upgrade has gone successfully prior to testing an unknown.
System does not recognize all the processors you installed	 Processors or power pods not fully seated. Power cable from processor board to power pod not fully seated. Power pod not fully engaged into processor. Bent pin(s) on processor(s). 	 Check seating on processors and power pods. Verify that you do not have any bent processor pins. Check the power cable from processor board to power pod connections.
No video, LED on top cover indicates still stuck in reset	 Seating of processor, DC-to-DC converters, or any board. Bad power pod or DC-to-DC converter. 	 Check seating on all boards, DC-to-DC converters, and processors. Check for bent pins on all connectors. Replace power pod. Replace DC-to-DC converters.
No video, but the system is not stuck in reset	Memory board or DIMM not functional.	 Check seating of memory board and DIMMs. Replace DIMMs. Ensure proper population of DIMM banks.
SCSI drives are not recognized during POST	Drive not fully seated.	Check seating of HDD.
LS-240 or CD ROM not recognized by BIOS/EFI	IDE cable or power cable not connected to drives.	 Check seating of drive into adapter board. Check that BIOS setup has these devices enable.